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FLORA OF COSTA RICA

BY

PAUL C. STANDLEY

CURATOR OF THE HERBARIUM, DEPARTMENT OF BOTANY

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BOTANICAL SERIES
FIELD MUSEUM OF NATURAL HISTORY
VOLUME XVIII, PART III
JULY 29, 1938

PUBLICATION 420

PRINTED IN THE UNITED STATES OF AMERICA
BY FIELD MUSEUM PRESS

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FLORA OF COSTA RICA

PAUL C. STANDLEY

MELASTOMACEAE. Melastome Family

Reference: Cogniaux, Melastomaceae, in DC. Monogr. Phan. 7. 1891.

Herbs, shrubs, or rarely trees, sometimes epiphytic or scandent; leaves without stipules, opposite, commonly petiolate, nearly always with conspicuous longitudinal nerves extending from base to apex, rarely (in *Mouriria*) penninerved; flowers regular, perfect, variously disposed, small or large, often showy, mostly white or pink; calyx tube (hypanthium) free or united with the ovary, the limb truncate or lobate, sometimes calyptriform and circumscissile, often with accessory, toothlike, dorsal appendages on the lobes; petals as many as the calyx lobes, dextrorsely convolute; stamens perigynous, inflexed in bud, commonly twice as many as the petals, equal or unequal, the filaments geniculately inflexed in anthesis; anthers basifixed, dehiscent commonly by 1 or 2 terminal pores, the connective often produced at the base and appendaged at the apex; ovary 2–many-celled, the style simple, the stigma capitate or punctiform, the ovules numerous; fruit capsular or baccate; seeds usually minute, pyramidal, cuneate, cochleate, or filiform.—One of the largest families of tropical American plants, well represented in Costa Rica. One or two additional genera may have representatives in the region. One term used on the following pages should be explained here. A 3–5-nerved leaf is one in which the 3 or 5 nerves arise at the very base of the blade; a 3–5-plinerved leaf is one in which the 3 or 5 nerves, or at least some of them, arise some distance above the base of the blade. The disposition of the nerves is an important and constant character in the separation of species. The Melastomaceae are noteworthy for the fact that, as a rule, the species, although numerous and often separable by small differences, are remarkably uniform in flower and foliage characters, exhibiting less variation than in most other families of plants.

For assistance in preparation of the account of this family the writer is under special obligations to Mr. C. V. Morton, who has furnished important data from material in the United States National Herbarium. Mr. Morton is, however, in no way responsible for any errors in interpretation of such data that may have been made by the writer.

106331

ACIOTIS D. Don

Fragile herbs, usually growing in wet soil; leaves petiolate, mostly ovate, membranaceous; flowers small or minute, sessile or subsessile, paniculate, white or pink, 4-parted; calyx glabrous or pilose, the tube globose or ovoid, the teeth short, broad, deciduous; petals ovate or lanceolate, acute, sometimes setiferous at the apex; stamens 8, equal or nearly so, the anthers all alike, orbicular or oblong, 1-pored, the connective short- or long-produced below the cells, not appendaged; ovary globose or ovoid, glabrous, 2-celled; capsule small, thin-membranaceous, indehiscent but rupturing irregularly; seeds reniform-cochleate, foveolate.—Probably one or two additional species occur in Central America.

Aciotis annua (Mart.) Triana. Reported from Puerto Viejo on the Atlantic coast, *Biolley 6912*. Extending to Brazil. An annual, the stem distinctly 4-winged, sparsely short-pilose; leaves narrowly ovate, acute, 7-nerved, pilose on both surfaces, 5–7 cm. long; anthers orbicular.

Aciotis indecora (Bonpl.) Triana, var. **macrophylla** Cogn. Reported from Carrillo, *Tonduz 2528*. The species extends to Brazil. Plants rather stout, as much as 1 meter high; leaves ovate, long-acuminate, often cordate at the base, 5–11 cm. long, 7-nerved, the petiole pilosulous; panicles large and rather diffuse; calyx 2.5 mm. long; anthers narrow, elongate; capsule 3.5 mm. long.

Aciotis paludosa (Mart.) Triana. Frequent in the tierra caliente, especially the Atlantic, growing in moist or wet soil, often about swamps. Guatemala to Brazil. Plants much branched, sometimes 1 meter high, the stems narrowly winged, densely short-pilose, brown; leaves long-petiolate, the blades mostly ovate or oblong-ovate and 5–9 cm. long, acute or short-acuminate, rounded or obtuse at the base, 5-nerved, entire, pilose; flowers white, short-pedicellate, in small panicles; calyx 2.5 mm. long; petals 3–4 mm. long; anthers orbicular; capsule 3 mm. in diameter. A frequent, weedy plant in many parts of the Atlantic tierra caliente of Central America, ordinary and uninteresting in appearance.

Aciotis rostellata (Naud.) Triana. Reported from Buenos Aires, *Pittier 6517*. Ranging to Mexico. Stems acutely tetragonous, not winged, densely and shortly glandular-pilose above; leaves ovate-oblong, acuminate, 5–7 cm. long, short-pilose on both surfaces; panicles large, the flowers short-pedicellate; calyx 1.5 mm. long;

petals white, 2 mm. long; anthers short-beaked; capsule 2.5 mm. in diameter.

ACISANTHERA P. Br.

Low herbs, usually growing in wet soil, glabrous or pubescent; leaves small, sessile or short-petiolate, entire or serrulate; flowers small, purple or pink, terminal and axillary, solitary or in small panicles, 4–5-parted; calyx glabrous or setose, the tube hemispheric or campanulate, the lobes acuminate, equaling the tube; petals obovate or rounded; stamens 8 or 10, the smaller ones usually imperfect, the filaments glabrous, the larger anthers obovoid to oblong or subulate, 1-pored, the connective long-produced below the cells, anteriorly bifid or bicalcarate; ovary glabrous, 2–4-celled; seeds ovoid or short-oblong, subreniform or subcochleate, densely foveolate.—At least two other species are known from Central America.

Acisanthera quadrata Juss. Occasional in moist savannas of the Pacific coast, at least in the region of Buenos Aires, at 250–500 meters. Mexico to Panama and West Indies, and reported from Peru. Plants rather stout but commonly less than 30 cm. high, branched to the base, the branches tetragonous, glandular-pilose; leaves broadly ovate to ovate-lanceolate, acutish, serrulate, mostly 1–1.5 cm. long, short-petiolate; calyx tube campanulate-urceolate, 3 mm. long, the lobes 2–4 mm. long; petals pink or purple, 6 mm. long; larger anthers oblong, not arcuate; capsule 4 mm. in diameter.

Acisanthera recurva (L. Rich.) Griseb. Reported from Buenos Aires, *Tonduz 4973*. Extending to Brazil. Similar to *A. quadrata*, but the larger anthers linear-subulate and arcuate.

ADELOBOTRYS DC.

Scandent shrubs, glabrous or pubescent, the branches terete; leaves broad, petiolate, 3–5-nerved, entire or serrulate; flowers small, in terminal panicles, 5-parted; calyx tube narrowly oblong or urceolate, the lobes of the limb 2-ranked, the outer lobes distant, subulate or triangular, confluent with the inner ones; petals obovate or cuneate-oblong, coherent with each other and at the base with the filaments; stamens 10, equal, the filaments filiform, the anthers linear-subulate, rostrate, 1-pored at the apex, the connective not produced below the cells; ovary usually 5-celled; capsule oblong, coriaceous; seeds produced at each end into a filiform appendage.—A single species is known from Central America.

Adelobotrys adscendens (Swartz) Triana. Frequent in the tierra caliente, at 950 meters or less; region of San Ramón. Mexico

to Jamaica and Bolivia. An epiphytic vine, reported to be sometimes 7 meters long but usually smaller, glabrous or nearly so; leaves firm, entire, broadly ovate or elliptic, mostly 8–15 cm. long, acute or short-acuminate, 5-nerved; panicles rather dense and thyrsiform, 10–30 cm. long, the flowers pedicellate; calyx 6–7 mm. long, puberulent at first; petals pale yellow, 7–8 mm. long; capsule conspicuously costate, about 8 mm. long.

ARTHROSTEMMA Ruiz & Pavón

Slender, succulent and fragile herbs, dichotomously branched, glabrous or nearly so; leaves petiolate, ovate to oblong, membranaceous, serrulate, 5–7-nerved, often very unequal; flowers rather large, pink or purple, in small, terminal cymes, 4-parted; calyx glabrous, the tube oblong or narrowly campanulate, the lobes triangular, much shorter than the tube, persistent; petals obovate, apiculate, caducous; stamens 8, somewhat unequal, the filaments glabrous, the anthers unlike, linear, falcate-recurved, obtuse and minutely 1-pored at the apex, the cells undulate, the connective in the larger anthers produced below the cells, posteriorly not appendaged, anteriorly produced into a filiform appendage; ovary 4-celled, usually glabrous; capsule membranaceous, 4-valvate, the seeds cochleate, rather large, longitudinally striate.—Several other species are known from Central America.

Arthrostemma alatum Triana. Nicoya, *Tonduz 13519*. Extending to Venezuela. Plants about 60 cm. high, the stems 4-winged, glabrous or sparsely glandular-pilose; leaves ovate, long-petiolate, 5–7 cm. long, acute, subtruncate at the base, 7-nerved; flowers subsessile; calyx 4–5 mm. long; petals 4 mm. long; stamens subequal; capsule 5 mm. long.

Arthrostemma campanulare (Naud.) Triana. Frequent in moist, shaded places, ascending from the coasts to the Meseta Central, to about 1,500 meters; region of San Ramón. Extending to Ecuador and Venezuela. Plants mostly rather low and often erect, but sometimes subscandent and 3 meters long, glabrous or the young branches very sparsely glandular-pilose; leaves long-petiolate, very thin when dried, ovate or oblong-ovate, mostly 4–6 cm. long, acuminate, rounded or cordate at the base, 5-nerved; calyx 7–8 mm. long; petals purple, almost 2 cm. long; stamens very unequal; capsule oblong, about 1.5 cm. long. The flowers are rather showy and handsome, but the delicate petals fall as soon as the plant is shaken.

AXINAEA Ruiz & Pavón

Shrubs or trees, glabrous or pubescent; leaves petiolate, coriaceous, mostly ovate or oblong, acute, entire or serrate, 3–7-nerved; flowers pedicellate, in terminal and lateral panicles, 5-parted; calyx glabrous or puberulent, the tube hemispheric or cyathiform, the limb dilated, truncate or obscurely lobulate; petals oblong or obovate, obtuse or emarginate, imbricate to form a campanulate corolla; stamens 10, equal or subequal, the filaments glabrous, plane, rather broad, the anthers straight, linear-subulate, minutely 1-pored at the apex, the connective not produced at the base, not appendaged anteriorly, posteriorly with a thick and often inflated appendage; ovary 4–5-celled, glabrous; seeds oblong-pyramidal.—A single species is found in Central America, the others being South American.

Axinaea costaricensis Cogn. in DC. Monogr. Phan. 7: 1182. 1891. Isla del Mancarón, slopes of Volcán de Barba, 2,100 meters, *Pittier 2007*. Collected also at Vara Blanca. Endemic. A shrub, at first minutely furfuraceous on the younger parts but soon glabrate; leaves long-petiolate, the blades elliptic, 8–14 cm. long, obtuse at the base, usually abruptly contracted and short-acuminate at the apex, 5-nerved, entire or remotely denticulate, the margin reflexed at the base; panicles lateral, pyramidal, rather large, erect or subpendulous, many-flowered, the pedicels as much as 1 cm. long; calyx 7–8 mm. broad, the limb entire; petals pink, obovate, 13–15 mm. long.

BELLUCIA Neck.

Trees or shrubs, usually glabrous, the branches thick; leaves large, coriaceous, petiolate, entire, 5-nerved or 3–5-plinerved, often glaucous beneath; flowers large, white or pink, pedicellate, axillary, solitary or fasciculate or in small panicles, 5–8-parted, not involucrate; calyx glabrous, the tube turbinate or hemispheric, the limb usually divided into regular lobes, sometimes calyptriform; petals obovate or oblong, fleshy, glabrous; stamens twice as many as the petals, equal, the filaments short, thick, glabrous, the anthers often coherent, short, thick, laterally compressed, obtuse, 2-pored at the apex, the connective not produced below the cells, not appendaged; ovary glabrous, 8–15-celled; fruit baccate, coalescent with the fleshy calyx tube.—One or two other species are found in Central America.

Bellucia costaricensis Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 264. 1891. *Coronillo, Papaturro agrio.* Along a stream at Buenos Aires, *Pittier 3785*. Region of the type, also at Térraba and in

El General, at 500 meters or less. Extending to Guatemala. A tree with rounded crown, the branches more or less furfuraceous-puberulent when young; leaves ovate-elliptic or broadly elliptic, 20–30 cm. long, 5-plinerved, short-acuminate or obtuse, obtuse or acutish at the base, obscurely puberulent or almost wholly glabrous; flowers fasciculate in the leaf axils or at defoliate nodes, long-pedicellate, the calyx 2–2.5 cm. wide, the lobes broadly triangular, acute; petals 1.5 cm. long. The large, juicy fruits are edible. Pittier reports the Térraba name of Shkuar-bón.

BLAKEA P. Br.

Shrubs or small trees, erect or occasionally scandent, glabrous or variously pubescent, the branches usually terete; leaves petiolate or subsessile, large or small, mostly coriaceous and broad, entire or nearly so, 3–5-nerved, with numerous transverse, parallel veins; flowers usually large, axillary, solitary or fasciculate, on long or short pedicels, pink, purple, or white, surrounded by 4 or rarely 6 subcoriaceous bracts, these opposite by pairs; flowers 6-parted; calyx tube broadly campanulate, the limb simple, short or elongate, 6-lobate, persistent; petals oblong or obovate, glabrous; stamens 12, equal, the filaments thick, glabrous, the anthers thick, subhorizontal or pendulous, laterally compressed, short, obtuse and minutely 2-pored at the apex, the connective not produced below the cells, anteriorly not appendaged, produced posteriorly into a spur; ovary 4–6-celled; fruit a juicy berry.—A few other species are native in Central America.

Blakea anomala Donn. Smith, Bot. Gaz. 42: 297. 1906. *San Miguel.* On rotten logs, La Palma de San José, 1,450–1,550 meters, *Pittier 10165.* Frequent in forests of the central mountains, 1,200–2,200 meters; region of San Ramón. Endemic. A shrub or small tree, usually 3–6 meters high, the branches slender, densely brownish-furfuraceous; leaves small, oblong-elliptic or ovate-elliptic, mostly 6–10 cm. long, abruptly caudate-acuminate, the acumination very long and narrow, acute at the base, 5-nerved, glabrous above, somewhat furfuraceous beneath; pedicels solitary, often greatly elongate and filiform, the bracts triangular, minute; calyx at first closed, in flower irregularly 4-lobate, 7 mm. long, minutely furfuraceous; petals 1.5 cm. long, pink or white. Easily recognizable by the very small bracts and the closed calyx; in general appearance much like *B. gracilis.*

Blakea gracilis Hemsl. Diag. Pl. Nov. 1: 13. 1878; Biol. Centr. Amer. Bot. *pl. 23. San Miguel, Catarina.* Type collected by Endres, without locality. Frequent in mountains of the central region, mostly at 1,200–1,800 meters, but descending to the region of Pejivalle, 850 meters; Santa María de Dota; region of San Ramón. Endemic. A large shrub or small tree, commonly 3–5 meters high, the branches slender, glabrous or nearly so; leaves small, rather thin, obovate-elliptic, mostly 5–8 cm. long, abruptly acuminate or caudate, acute at the base, glabrous or nearly so; pedicels 2–5 cm. long; bracts foliaceous, the outer ones obovate, 2–3 cm. long; calyx truncate or obscurely lobate; petals 2 cm. long, white or pink; dry fruits conspicuously costate. Both the flower buds and the ripe fruits are eaten; they are juicy and have a most agreeable, rather tart flavor. Var. *longifolia* Cogn. (Bull. Soc. Bot. Belg. 30, pt. 1: 266. 1891; based on material collected between El General and Río San Pedro, *Pittier 3764;* reported also from the Tuis Valley) is a form with oblong, caudately long-acuminate leaves 8–12 cm. long, long-attenuate at the base, the bracts narrower than in the type.

Blakea grandiflora Hemsl. Diag. Pl. Nov. 1: 13. 1878. *San Miguel blanco.* Type from Costa Rica, *Endres 230.* Mountains of the central region and about San Ramón, at 1,100–2,000 meters. Endemic. A shrub of 1–4 meters, usually or always epiphytic, glabrous or nearly so, the branches stout; leaves long-petiolate, coriaceous, oblong-elliptic to broadly elliptic, abruptly and shortly caudate-acuminate, obtuse or acutish at the base, 5-plinerved, mostly 10–15 cm. long; flowers pedicellate, the bracts rigid, furfuraceous, broadly ovate, obtuse, 2–2.5 cm. long; calyx almost 2 cm. broad; petals white or pink, 3 cm. long, glabrous. A showy and handsome plant because of its large flowers.

Blakea Pittierii Cogn. in DC. Monogr. Phan. 7: 1080. 1891. La Palma de San José, 1,550 meters, *Pittier.* Known only from the region of the type. Endemic. A shrub or small tree, 4–5 meters high, the branches thick, densely furfuraceous-puberulent when young; leaves obovate-elliptic, 15–20 cm. long, coriaceous, abruptly short-acuminate, acutish at the base, 5-nerved, stellate-furfuraceous beneath; flowers long-pedicellate, the outer bracts ovate, rigid, obtuse-acuminate, 2.5 cm. long; calyx 6-lobate; petals obovate-spatulate, 3 cm. long, glabrous.

Blakea subpeltata Cogn. in DC. Monogr. Phan. 7: 1075. 1891. Turrialba, *Oersted 2813.* Collected also at Tapantí. Endemic.

Branches rather slender, when young densely furfuraceous-puberulent; leaves oval or obovate-elliptic, 7–12 cm. long, rounded at the apex and abruptly short-acuminate, subpeltate at the base and broadly rounded, glabrous above, sparsely furfuraceous-puberulent beneath, 5-nerved; bracts ovate-lanceolate or lanceolate, 1–2.5 cm. long, acuminate, sparsely furfuraceous; calyx tube 5–6 mm. wide, glabrate, the lobes very short and broad.

Blakea tuberculata Donn. Smith, Bot. Gaz. 31: 111. 1901. *San Miguel.* Near La Palma de San José, 1,550 meters, *Tonduz 7363* (*Herb. Nac. Costa Rica 12435*). Frequent in mountains of the central region, at 1,100–1,600 meters, in forest or along the borders of pastures. Endemic. A shrub or tree, 3–4 meters high or sometimes as much as 9 meters high and with a rounded crown, the branches thick, ferruginous-furfuraceous and strigose; leaves long-petiolate, broadly ovate or ovate-rounded, mostly 15–20 cm. long, abruptly short-acuminate, rounded at the base and often peltate, glabrous above, furfuraceous beneath, 5-nerved; pedicels usually fasciculate, stout, the outer bracts connate to the middle, broad, little exceeding the calyx, densely furfuraceous; petals pink, thick, oblong-obovate, densely tuberculate on both surfaces. Easily recognized by the large, densely tuberculate petals.

CALYPTRELLA Naud.

Trees or shrubs, the branches terete, pulverulent; leaves usually coriaceous, long-petiolate, entire, 3–7-nerved; flowers 4–9-parted, in large, terminal panicles, small, often subumbellate at the ends of the branches; calyx closed in bud, narrowly ovoid, the persistent tube hemispheric or short-campanulate, the limb calyptriform, circumscissile, acuminate; petals obovate-spatulate, acuminate; stamens twice as many as the petals, subequal, the anthers linear-oblong, sometimes recurved, 1-pored at the apex, the connective produced below the cells, unappendaged anteriorly, produced posteriorly into a spur; ovary 4–6-celled, pulverulent; capsule oblong, the seeds acicular, the testa slenderly produced at each end.—No other species are known from Central America.

Calyptrella cycliophylla Donn. Smith, Bot. Gaz. 55: 434. 1913. Along a stream near Buenos Aires, Prov. Puntarenas, 280 meters, *Tonduz 4964.* Collected also at Río de La Unión. Colombia. Branches ferruginous-furfuraceous or glabrate; leaves suborbicular, long-petiolate, 19–22 cm. long, deltoid-cuspidate, obtuse at the base,

5-nerved, coriaceous; flowers 6-parted, in bud 5.5 mm. long; petals 5 mm. long; capsule 5 mm. long.

CENTRADENIA G. Don

Plants low, herbaceous or suffrutescent, the slender branches tetragonous or 4-alate; leaves petiolate, lanceolate, unequal at the base, those of a pair often very unequal; flowers small, 4-parted, pink or white, in corymbiform cymes; calyx glabrous or pubescent, the tube campanulate, somewhat tetragonous, the 4 lobes shorter than the tube; petals obovate or rounded; stamens 8, unlike, the filaments glabrous, the anthers oblong or ovoid, obtuse, 1-pored at the apex, the cells undulate, the connective produced below the cells, appendaged anteriorly; ovary 4-celled, glabrous; capsule 4-valvate, the seeds minute, ovoid.—One or two other species may occur in Central America.

Centradenia grandifolia (Schlecht.) Endl. Collected at Santa María de Dota, Zarcero, and Naranjo, 1,500–2,300 meters, and doubtless growing elsewhere. Ranging to Mexico. Plants erect, as much as 1.5 meters high, sometimes creeping and rooting at the nodes, slender, the stems 4-winged, sparsely glandular-pilose; leaves short-petiolate, oblong-lanceolate, mostly 7–18 cm. long, very thin and lax, pilosulous on both surfaces, pale beneath, ciliate, narrowly long-acuminate; cymes many-flowered; calyx red; petals pink, 8 mm. long. The leaves are much larger than those of *C. inaequilateralis*.

Centradenia inaequilateralis (Schlecht. & Cham.) G. Don. Frequent in moist, shaded places at middle elevations, mostly at 600–1,500 meters; Guanacaste; region of San Ramón; extending also into the upper part of the tierra caliente on both slopes. Panama to Mexico. Plants slender, usually less than 50 cm. high, the stems tetragonous, short-hirtellous, not glandular; leaves narrowly lanceolate, mostly 2–4 cm. long, attenuate-acuminate, pale beneath, sparsely pilosulous; flowers mostly clustered in the upper leaf axils; petals obovate, pink, 5–6 mm. long. A rather pretty but not at all conspicuous plant, found most often, perhaps, on perpendicular, shaded banks.

CENTRONIA D. Don

Shrubs or trees, glabrous or variously pubescent; leaves petiolate, usually large, coriaceous, entire or dentate, 3–5-nerved; flowers 5–7-parted, rather large, in large, terminal panicles; calyx furfuraceous or hirsute, the tube oblong or hemispheric, the limb closed in bud,

conic, circumscissile in anthesis; petals broadly obovate, rounded or apiculate at the apex, sometimes coherent by their bases; stamens twice as many as the petals, equal, the filaments subulate, arcuate, the anthers linear, short or elongate, attenuate and 1-pored at the apex, the connective not produced below the cells, not appendaged anteriorly, with an obtuse or subulate appendage posteriorly; ovary 3–7-celled; fruit capsular, the seeds straight, pyramidal.—No other species occur in Central America.

Centronia phlomoides Triana, Trans. Linn. Soc. 28: 72. 1871. Type collected in Costa Rica by Hoffmann. Frequent in forests of the central mountains, chiefly at 1,200–1,500 meters; region of San Ramón. Endemic. A shrub or small tree, commonly 4–5 meters high, the branches tetragonous, sparsely furfuraceous; leaves subcoriaceous, on rather short petioles, mostly broadly elliptic and 10–18 cm. long, 5-plinerved, acute or short-acuminate, rounded or obtuse at the base, glabrous above, densely stellate-puberulent and setulose beneath; panicles terminal, long-pedunculate, the branches and pedicels verticillate, the pedicels mostly 1–1.5 cm. long, the flowers 5-parted; calyx densely furfuraceous-tomentose, 11–12 mm. long, obtuse in bud; petals 12 mm. long; capsule conspicuously costate, about 7 mm. long.

CHAETOLEPIS Miq.

Dwarf, rigid shrubs, variously pubescent or glabrate; leaves very small, ovate to oblong; flowers small, 4-parted, pink or purple, solitary or corymbose at the ends of the branches, sessile or short-pedicellate; calyx tube ovoid or hemispheric, short, the lobes triangular, persistent, usually about as long as the tube, sometimes alternating with teeth or bristles; petals ovate or obovate, each usually terminated by a seta; stamens 8, equal, the filaments glabrous, the anthers alike, short, linear-oblong, minutely 1-pored, the connective not appendaged, not or very shortly produced below the cells; ovary 4-celled, setose at the apex; fruit capsular, the seeds ovoid-cochleate, smooth.—No other species are known from Central America.

Chaetolepis Cufodontisii Standl., sp. nov.—Fruticulus dense ramosus erectus vix ultra 30 cm. altus, ramulis gracilibus erectis tetragonis glabris dense foliatis, internodiis brevibus; folia parva brevissime petiolata coriacea, petiolo crasso vix 1 mm. longo; lamina lanceolato-oblonga ca. 9 mm. longa atque 2.5–3 mm. lata, apicem obtusum versus angustata, basi acuta, glabra, remote vel

subdense crenato-serrulata, trinervia, supra intense viridis, costa impressa, subtus pallidior densiuscule puncticulata; flores breviter pedicellati axillares vel subcorymbosi; calyx glaber, tubo hemisphaerico 3 mm. longo, lobis triangulari-attenuatis tubo paullo brevioribus setuloso-ciliatis, cum setulis brevibus alternantibus; petala ut videtur lutea calycis lobis fere duplo longioribus acuminatis; capsula ca. 3 mm. longa.—Without locality, *Endres*, ex Herb. Vindob. (type in Herb. Field Mus.); Los Frailes, 1,600 meters, *M. Valerio 1373;* Cerros de Velirla, Copey, 2,700 meters, *Tonduz 11903*. Under the name *C. alpina* Naud. the plant is reported also from Alto del Abejonal, collected by Tonduz. It has been determined previously as *C. alpina*, a species of the mountains of Colombia and Venezuela, which differs most conspicuously in having the leaves rather densely setose-ciliate. The Costa Rican species is named for Dr. Giorgi Cufodontis, who in his work upon the Costa Rican plants of the Porsch Expedition, noted upon a sheet in the Vienna Herbarium the evident differences between the Costa Rican and South American plants.

CLIDEMIA D. Don

Shrubs, commonly setose, villous, or tomentose; leaves mostly petiolate, sometimes bearing inflated appendages, 3–5-nerved, entire or denticulate; flowers 4–5-parted, in axillary panicles or fascicles, sometimes capitate-congested, commonly small, white, pink, or purple; calyx variously pubescent, the tube campanulate to urceolate, the limb often produced beyond the ovary, truncate or usually short-lobate, the lobes often appendaged with elongate teeth; petals obtuse or retuse, usually glabrous; stamens equal or slightly unequal, twice as many as the petals, the filaments glabrous, subulate or filiform, the anthers linear-elongate or filiform, straight or curved, minutely 1-pored at the apex, the connective commonly not produced below the cells, not appendaged at the base or sometimes gibbous or subcalcarate; ovary 3–5-celled, glabrous or more often setulose; fruit baccate, generally globose, small, crowned by the persistent calyx limb; seeds mostly minute, smooth or granulate. —Other species are found in Central America.

Clidemia Biolleyana Cogn. in DC. Monogr. Phan. 7: 1193. 1891. Near Carrillo, *Pittier 2537*. Endemic. Younger branches as well as the petioles, peduncles, and calyces densely furfuraceous-puberulent; leaves short-petiolate, those of a pair very unequal, broadly ovate to suborbicular, the larger 12–17 cm. long, shortly

obtuse-acuminate, rounded or subcordate at the base, entire, 7–9-nerved, glabrous above, furfuraceous beneath on the nerves; flowers 4-parted, the panicles large, broadly pyramidal, many-flowered, as much as 10 cm. long, the pedicels short; calyx 8-costate, 3 mm. long, the limb shortly acute-dentate; petals 1.5 mm. long.

Clidemia brachystephana (Naud.) Triana. Frequent in thickets of the tierra caliente, ascending to the region of San José, at 1,100 meters; region of San Ramón. Guatemala to Colombia. A slender shrub, the branches, petioles, and peduncles short-hirsute; leaves lanceolate or oblong-lanceolate, mostly 8–12 cm. long, long-acuminate, acute or obtuse at the base, 5-plinerved, denticulate or almost entire, more or less setose-hirsute on both surfaces; cymes few-flowered, scarcely exceeding the short petioles, the calyx densely hirsute, the tube 4 mm. long, the 5 outer teeth 3 mm. long; petals 1 cm. long.

Clidemia bullosa (Spreng.) Cogn. Frequent in the central region; El General; region of San Ramón; Cocos Island; ascending to 2,400 meters. Ranging to Brazil. Branches, peduncles, and calyces densely stellate-pilose and glandular-setose; leaves long-petiolate, ovate or oblong-ovate, long-acuminate, mostly 8–12 cm. long, more or less bullate, duplicate-serrate, rounded at the base, strigose above or hirsute, stellate-hirtellous beneath; panicles pyramidal and many-flowered, 3–8 cm. long; calyx tube 2.5 mm. long, the teeth 1 mm. long; petals purple or white, 3 mm. long; fruit subglobose, 3 mm. in diameter.

Clidemia costaricensis Cogn. ex Donn. Smith, Enum. Pl. Guat. 5: 28. 1899, nomen. *Purra.* Frequent about La Palma de San José, at 1,500 meters or less; also in forests of the tierra caliente; region of San Ramón. Endemic. A slender shrub, the branches densely setose-hirsute; leaves on short or elongate petioles, lance-oblong to oblong-elliptic, long-acuminate, obtuse to acutish at the base, 5-nerved, crenate-serrulate, hirsute on both surfaces; cymes few-flowered, little if at all exceeding the petioles, setose-hirsute; calyx densely setose-hirsute, the tube 2.5 mm. long, the 5 teeth about 1 mm. long; petals white, 3 mm. long. So far as I know, no proper Latin description of this species has been published. It is possible that its author decided that it was synonymous with some other one.

Clidemia dentata D. Don. *Purra.* Frequent in forests of the tierra caliente, ascending almost to the Meseta Central; region of

San Ramón. Mexico to Brazil. Usually a slender shrub of 1–2 meters, the branches hirsute; leaves oblong or ovate-oblong, 6–12 cm. long, often tinged with purple, long-acuminate, obtuse or acutish at the base or sometimes rounded, 5-nerved, rather densely setose-pilose on both surfaces, entire or denticulate; cymes 2–3 cm. long, few-flowered; calyx densely hirsute, the tube 4 mm. long, the 5 outer teeth 4–6 mm. long; petals white or pink, 6 mm. long; berries 6–7 mm. long.

Clidemia epiphytica Cogn. Reported from Río Naranjo, Pacific tierra caliente, *Tonduz 7575*. Guatemala to Colombia. A small, slender, creeping, subscandent epiphyte, the young branches furfuraceous-puberulent and sparsely setulose; leaves long-petiolate, ovate, 8–20 cm. long, acuminate, usually cordate at the base, coarsely duplicate-serrate, 7-nerved, glabrate; cymes 3–5-flowered, very short; calyx long-hirtellous, the outer teeth oblong-lanceolate, longer than the tube, 3 mm. long.

Clidemia fraterna Gleason, Brittonia 2: 323. 1937. Near El General, Prov. San José, *Skutch 2687*. Endemic. A slender shrub 3 meters high, the branches closely stellate-furfuraceous; leaves very shortly petiolate, oblong-elliptic, to 15 cm. long, abruptly acuminate, cuneate at the base, entire, 5-plinerved, furfuraceous beneath along the nerves; flowers collected in 1–3-flowered heads, these in small cymes; calyx tube 2 mm. long, minutely furfuraceous, the lobes 3–5, broadly triangular, the outer teeth 0.5 mm. long; petals white, almost 4 mm. long.

Clidemia hirta (L.) D. Don. Occasional in forest and thickets of the tierra caliente. Widely distributed in tropical America. A slender shrub, commonly 1–2 meters high, the branches densely long-hirsute and more or less stellate-puberulent; leaves short-petiolate, often unequal, ovate or oblong-ovate, short-acuminate, rounded or cordate at the base, 5–7-nerved, crenulate or subentire, hirsute; cymes few-flowered, short, the flowers short-pedicellate; calyx tube 5 mm. long, setulose and stellate-puberulent, the outer teeth 2–4 mm. long; petals white or pink, 8–10 mm. long; fruit blackish or dark purple, 6–7 mm. in diameter. This species is a common shrub in many parts of the Atlantic tierra caliente of Central America. The var. *elegans* (Aubl.) Griseb. has been reported from Costa Rica, but it appears to be a form of very little systematic significance.

Clidemia laxiflora (Schlecht.) Walp. Reported from La Ardilla, *Tonduz 7737*. Extending to Mexico. Branches sparsely short-hirtellous; leaves conspicuously unequal, ovate, 9–12 cm. long, long-acuminate, subcordate at the base, duplicate-serrulate, 7-nerved, short-hirtellous; flowers paniculate, the panicles elongate, the pedicels 2–10 mm. long; calyx tube 3 mm. long, the outer teeth 2.5–3 mm. long; petals red, 4–6 mm. long; fruit black, 5 mm. in diameter.

Clidemia melanotricha Triana, Trans. Linn. Soc. 28: 136. 1871. Type collected in Costa Rica by Hoffmann. Plants setose-hirsute throughout; leaves on rather short petioles, ovate-lanceolate, 7–12 cm. long, long-acuminate, 5-plinerved; flowers paniculate, pedicellate, the panicles on peduncles 10–12 cm. long, few-flowered; calyx tube 4–5 mm. long, the lobes triangular-ovate, spreading.

Clidemia Mortoniana Standl., sp. nov.—Frutex gracilis 1.2 m. altus, ramis gracilibus teretibus viridibus sparse pilis longis laxis pallidis ut videtur crispatis pilosis, internodiis elongatis, nodis densissime setis numerosis longis albidis onustis; folia inaequalia longipetiolata membranacea, petiolo gracili, in foliis majoribus usque 6.5 cm. longo, in foliis minoribus interdum vix 1 cm. longo, fere glabro, tantum ad apicem dense pallide longisetoso; lamina late elliptica, rotundato-elliptica vel late elliptico-ovata, 6.5–12 cm. longa 4–8 cm. lata, subabrupte breviter acutata, basi rotundata atque breviter emarginata, interdum profundius cordata, basi 7–9-nervia, margine arcte crenato-dentato, dentibus setuloso-mucronatis, supra in juventute ad nervos atque basin versus pilis longis albidis laxis crispis sparse pilosa, cito glabrata, basi ipsa setis numerosis pallidis longis dense setosa, subtus fere concolor, primo ad nervos sparse villosa, cito glabrata, statu adulto fere omnino glabra; flores mediocres in paniculas sessiles subdense multifloras usque 2.5 cm. longas solitarias vel aggregatas dispositi, ramis gracilibus glabris vel glabratis, bracteis minutis angustis setuloso-mucronatis; calyx glaber vel setulis paucis conspersus, tubo campanulato basi acutato 2 mm. longo, lobis brevioribus 4 late ovatis obtusis, dorso infra apicem dente subulato setuloso-attenuato viridi appendiculatis; petala ut videtur alba oblonga ca. 6 mm. longa apice rotundata; stylus 4 mm. longus glaber.—In forest, Vara Blanca de Sarapiquí, 1,500–1,750 meters, *Alexander F. Skutch 3154* (type in U. S. Nat. Herb.; photo. in Herb. Field Mus.).

Clidemia novemnervia (DC.) Triana. Cocos Island. Extending to Panama, West Indies, and Brazil. A slender shrub 2–3

meters high, the younger branches, petioles, and calyx densely stellate-tomentose and shortly glandular-setulose; leaves on rather short petioles, ovate or oblong-ovate, long-acuminate, rounded or emarginate at the base, 9-nerved, serrulate, 8–15 cm. long, foveolate and tomentellous beneath; flowers small, in rather many-flowered panicles 10–15 cm. long; calyx tube 4 mm. long, inner teeth 0.7–1 mm. long, outer teeth 1.5 mm. long; petals white, 5–7 mm. long.

Clidemia pubescens Gleason, Bull. Torrey Club 58: 82. 1931. Forests of Boca de Zhorquín, Talamanca, *Tonduz 8574*. Collected also at Kitadiku, Talamanca. Endemic. Plants apparently low and suffrutescent, the stems, petioles, and inflorescence sparsely pubescent and covered with long, yellowish, stiff, almost spinelike setae, these spreading or on the stems reflexed; leaves short-petiolate, elliptic-oblong, up to 15 cm. long, abruptly short-acuminate, rounded or subcordate at the base, almost entire, 5-plinerved, bearing at the base 2 small, hollow, bladder-like formicaria; peduncles slender and elongate, terminated by a few-flowered cyme, the flowers 4-parted; fruit glabrous.

Clidemia purpureo-violacea Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 263. 1891. Forests between Río La Unión and Río Convento, Diquís, *Pittier 3772*. Endemic. Younger branches and petioles densely furfuraceous-puberulent; leaves long-petiolate, ovate-cordate, up to 25 cm. long, rather long-acuminate, 9-nerved, minutely denticulate, glabrous above, sparsely furfuraceous beneath; cymes few-flowered, 2 cm. long, the pedicels 1–6 mm. long; outer calyx teeth ovate-oblong, half as long as the tube; fruit 4-sulcate, 2.5 mm. in diameter.

Clidemia pustulata DC. *C. fenestrata* Benth. Bot. Voy. Sulph. 94. 1844 (type from Cocos Island). Known in Costa Rica only from Cocos Island. Panama to Trinidad and Brazil. Young branches, petioles, and peduncles puberulent and rather sparsely glandular-hirtellous; leaves short-petiolate, 7–11 cm. long, long-acuminate, sparsely setulose-scabrous above, closely foveolate beneath and hirtellous, 5–7-nerved; panicles pyramidal, many-flowered, 7–12 cm. long; calyx tube 3 mm. long, the inner lobes 0.7 mm. long, the outer ones 1 mm. long; petals white, 4 mm. long.

Clidemia radicans Cogn. in Donn. Smith, Bot. Gaz. 20: 288. 1895. Jiménez, Llanuras de Santa Clara, 195 meters, *J. D. Smith 4789*. Atlantic tierra caliente; region of San Ramón. Endemic. Plants small and slender, evidently epiphytic, creeping and rooting,

the young branches, petioles, and peduncles finely and densely stellate-puberulent; leaves very unequal, oblong, the larger ones 10–17 cm. long, acute or short-acuminate, entire, 3-nerved, glabrate above, stellate-puberulent beneath, obliquely narrowed at the base; inflorescences few-flowered, small, the flowers 5-parted, short-pedicellate; calyx urceolate, slightly furfuraceous, 2.5 mm. long, the teeth minute; fruit 10-costate, 4–5 mm. in diameter.

Clidemia ramiflora Gleason, Brittonia 2: 323. 1937. El General, Prov. San José, 975 meters, *Skutch 2803*. Endemic. A shrub 3 meters high, the young branches glabrous; leaves petiolate, ovate-oblong to broadly elliptic or obovate-oblong, to 15 cm. long, gradually or abruptly acuminate, rounded at the base or cordulate, entire, 5-nerved, glabrous above, at first sparsely furfuraceous beneath but soon glabrate; cymes infra-axillary, 3–5 cm. long, many-flowered, the branches almost capillary, the flowers 4-parted, sessile; calyx tube glabrous, 1.7 mm. long, the inner teeth 0.3 mm. long, the outer ones triangular, slightly shorter.

Clidemia rubra (Aubl.) Mart. Frequent in rather dry, open places of the Pacific slope, ascending to the slopes of Poás; region of San Ramón; El General. Widely distributed in tropical America. A stout shrub, rarely more than 1 meter high, branched or often simple, the young branches and petioles very densely reddish-villous; leaves short-petiolate or subsessile, mostly oblong or elliptic, 6–10 cm. long, acute or short-acuminate, acute or obtuse at the base, 5-nerved, strigose or setulose and rough above, densely pilose beneath; flowers small, congested and sessile or nearly so in the leaf axils; petals red or pink, 3–5 mm. long; fruit black, 4–5 mm. in diameter. Easy of recognition by the sessile, clustered, axillary flowers. A characteristic plant of dry, sterile hillsides in many parts of Central America, but not confined to such situations.

Clidemia serrulata (Schlecht.) Triana. Forests of the Atlantic tierra caliente; region of La Palma de San José, at 1,400 meters; region of San Ramón. Extending to Mexico. Branches slender, ferruginous-hirsute; leaves ovate or lance-ovate, up to 15 cm. long, short-acuminate, rounded at the base, 5-nerved, setose-hirsute, duplicate-serrulate; panicles small, short, with slender branches, the flowers short-pedicellate; calyx densely short-hirsute, the tube 3–4 mm. long, the outer teeth 3–4 mm. long; petals 4–5 mm. long; fruit 6 mm. long.

Clidemia sessiliflora (Triana) Cogn. Leaves oblong-elliptic or oblong-lanceolate, 12–17 cm. long, caudate-acuminate, obtuse or cuneate at the base, glabrous on the upper surface, 5-plinerved; flowers sessile in the leaf axils; calyx tube 2.5 mm. long, the outer teeth 0.7 mm. long; petals 7–8 mm. long; fruit subglobose, 3 mm. in diameter. *C. sessiliflora* var. *angustifolia* Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 263. 1891, is based on *Pittier 3449*, collected between Alto del Palmital and La División, 1,100–2,160 meters; reported also from other localities in the same region, and from various places in the tierra caliente of both slopes. The typical form of the species is Peruvian.

Clidemia setosa (Triana) Gleason. *Maieta setosa* Cogn. Frequent in forests of the tierra caliente, especially the Atlantic, ascending the central mountains to 1,700 meters; region of San Ramón; Guanacaste. Ranging to Mexico. A stout shrub or suffrutescent plant, usually a meter high or less, the branches and petioles covered with long, yellowish, stiff, almost spinelike hairs, these spreading or reflexed; leaves short-petiolate, oblong or oblong-ovate, 10–20 cm. long, short-acuminate, rounded at the base, 7–9-nerved, entire, setose; petiole bearing 2 inflated formicaria at the apex; inflorescence umbel-like, short, the flowers short-pedicellate; calyx tube narrowly campanulate, sparsely furfuraceous, 2 mm. long, the limb shallowly 3–4-dentate; petals oblong, 3 mm. long, whitish.

Clidemia spectabilis Gleason, Bull. Torrey Club 58: 83. 1931. El Muñeco, Río Navarro, 1,500 meters, *Stork 2717*. Apparently frequent in forests of the region of San Ramón, 1,200–1,300 meters. Endemic. Plants stout, erect, suffrutescent or herbaceous, rarely more than 50 cm. high, the stems densely yellow-setose with very long, spreading hairs; leaves short-petiolate, broadly elliptic, up to 20 cm. long, broad at the apex and abruptly short-acuminate, rounded at the base, 7-plinerved, with 2 small, inflated formicaria near the base of the blade, bullate, rather densely setose on both surfaces; inflorescence dense and headlike, many-flowered, long-pedunculate, terminal or from the upper axils; flowers 5-parted, the calyx tube densely villous, the inner teeth ovate, obtuse, 0.7 mm. long, the outer ones subulate, 2 mm. long.

Clidemia spicata (Aubl.) DC. Savannas of the Pacific tierra caliente; Buenos Aires; Boruca. Mexico to Brazil. A slender shrub, the young branches, petioles, peduncles, and calyces stellate-tomentose and setulose; leaves on short or long petioles, ovate to

lance-oblong, mostly 6–10 cm. long, acuminate, rounded or rarely subcordate at the base, 5-nerved, minutely duplicate-dentate, bullate-strigillose above; flowers spicate, subsessile, the inflorescences short or somewhat elongate, usually nutant; calyx tube 3 mm. long, the inner teeth 1.5–2 mm. long, the outer ones 3–4 mm. long; petals white or pink, 4 mm. long; fruit purple-black, 5 mm. in diameter.

Clidemia strigillosa (Swartz) DC. Reported from Buenos Aires, *Tonduz 4958*. Ranging from West Indies to Peru. Similar to *C. spicata*, but the branches, petioles, and calyces covered with long, gland-tipped hairs. I have seen no Costa Rican material referable to the species.

Clidemia testiculata (Triana) Gleason. *Maieta testiculata* Cogn. In forests at middle elevations in the central region, also in the Atlantic tierra caliente; region of San Ramón; ascending to 1,200 meters or more. Ranging to Colombia and Venezuela. A rather stout shrub of 1–2 meters, the branches and peduncles densely and shortly glandular-hirtellous; leaves sessile or very shortly petiolate, ovate, acuminate, mostly cordate at the base, denticulate-serrate, 5–7-nerved, setulose above, densely hirtellous beneath, the petiole with small, inflated formicaria at the base, or these sometimes lacking; panicles rather large, pyramidal, many-flowered, commonly 6–12 cm. long; calyx sparsely short-setulose, the oblong tube 3 mm. long, the outer teeth subulate; petals 2 mm. long; fruit 7–8 mm. long.

Clidemia tococoidea (DC.) Gleason. *Maieta tococoidea* Cogn. Region of Talamanca, Atlantic tierra caliente. British Honduras to Brazil and Peru. Rather similar to *C. testiculata*, but the leaves long-petiolate, the petioles with rather large formicaria at the base; calyx tube minutely pubescent, usually not setose.

CONOSTEGIA D. Don

Shrubs or trees, glabrous or furfuraceous, rarely hispid, the pubescence often stellate; leaves petiolate, entire or denticulate, 3–5-nerved or 3–5-plinerved; flowers large or small, usually white, in terminal panicles, 5–10-parted; calyx tube campanulate or hemispheric, closed in bud, the limb calyptriform and in anthesis circumscissile at the base; petals obtuse or emarginate; stamens 10–25, equal, the filaments glabrous, the anthers linear or oblong, obtuse and 1-pored at the apex, the connective not produced at the base, not appendaged; ovary 5–15-celled; fruit baccate, the seeds obovoid or pyramidal, smooth.—A few additional species occur in Central

America. The genus is a rather large one, and from the standpoint of distribution unusual, because nearly all the species are North American, only a few extending to South America.

Conostegia Bernoulliana Cogn. Collected at Naranjo by Wendland. Also in Guatemala. Glabrous throughout; leaves long-petiolate, oblong-lanceolate, 12–17 cm. long, shortly obtuse-acuminate, attenuate at the base, 5-plinerved, entire; flowers 8-parted, the panicles pyramidal, 10 cm. long; buds globose or subglobose, muticous, 7–8 mm. in diameter, slightly verruculose. No material of this species has been seen by the writer.

Conostegia bigibbosa Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 252. 1891. Forests of El General, 800 meters, *Pittier 3793*. Endemic; not seen by the writer. Younger branches, petioles, peduncles, and leaves (beneath along the nerves) sparsely furfuraceous-puberulent, elsewhere glabrous; leaves large, elliptic-ovate, as much as 25 cm. long, abruptly apiculate, rounded at the base and bigibbous beneath, remotely denticulate, 5-nerved; flowers 8–10-parted, the large panicles broadly pyramidal; buds globose, rounded at the apex, 6–8 mm. long. Said to be related to *C. Oerstediana*.

Conostegia bracteata Triana. Forests of the Atlantic tierra caliente and at middle elevations on the Pacific slope. Nicaragua to Panama. A shrub, the branches covered with very long-stipitate, spreading, stellate-branched hairs; leaves short-petiolate, oblong, 10–18 cm. long, rather long-acuminate, obtuse or almost rounded at the base, denticulate, rather densely setose-pilose on both surfaces, the hairs of the lower surface often stellately branched at the apex, 5-nerved; panicles small but many-flowered, the flowers sessile, glomerate, the bracts small; buds acutish, densely setose, 3 mm. in diameter.

Conostegia Brenesii Standl., sp. nov.—Frutex 2–3.5 m. altus, ramis dense pilis stellatis sessilibus et longistipitatis intermixtis hirtellis; folia subaequalia 7–15 mm. longe petiolata, petiolis crassis dense stellato-tomentellis; lamina crasse membranacea lanceolato-oblonga 6–13.5 cm. longa 2.5–5 cm. lata vulgo longe anguste acuminata, basi acuta vel obtusa, denticulata vel subintegra, 5-plinervia, nervis superioribus interdum alte supra basin laminae insertis, supra dense setuloso-pilosa, tactu aspera, subtus multo pallidior sat dense stellato-pilosa, pilis plerumque sessilibus sed ex parte stipitatis; paniculae thyrsoideae erectae pedunculatae multiflorae vel interdum pauciflorae usque 6 cm. longae, floribus sessilibus vel breviter crasse

pedicellatis, bracteis parvis inconspicuis; alabastra ellipsoideo-ovoidea 6–7 mm. longa apice acutiuscula dense breviter setosa, setis apice radiatim stellato-ramosis; tubus calycis fere 4 mm. latus.—In forest, La Palma de San Ramón, 1,300 meters, July, 1937, *Brenes 5577* (type in Herb. Field Mus.); July, 1928, *Brenes 6199*. In forest toward Cerros de San Antonio de San Ramón, 1,100–1,200 meters, *Brenes 5633*. La Hondura de San José, 1,300 meters, *M. Valerio 707*. Flowers 5-parted, purple-violaceous, the buds pink.

Conostegia Cooperii Cogn. in DC. Monogr. Phan. 7: 705. 1891. Cartago, 1,700 meters, *Cooper 290*. Regions of Cartago and San Ramón, also in the upper part of the Atlantic tierra caliente, at 900–1,700 meters. Endemic. A shrub or tree, 2–6 meters high, the branches and petioles rather densely furfuraceous-tomentose; leaves on short or long petioles, elliptic-oblong or narrowly elliptic, mostly 8–13 cm. long, short-acuminate, acute or subobtuse at the base, entire or nearly so, 5-nerved or sometimes 5-plinerved, glabrous above, sparsely furfuraceous-puberulent beneath; panicles rather small and dense, many-flowered, the flowers 5-parted; buds glabrous, acutish at the apex, subtruncate at the base, somewhat constricted at the middle, glabrous, 7 mm. long; petals white.

Conostegia dolichostylis Donn. Smith, Bot. Gaz. 42: 294. 1906. In forest, Buenos Aires, Prov. Puntarenas, *Tonduz 4943*. Endemic; not seen by the author. Plants densely and stellately ferruginous-pubescent throughout except on the upper leaf surface; leaves petiolate, lanceolate, 8–15 cm. long, acuminate at each end, sinuate-denticulate, 5-plinerved, glabrous on the upper surface; flowers 5-parted, the small panicles few-flowered, the pedicels 11 mm. long or less; calyx tube turbinate-campanulate, 7 mm. long, pubescent.

Conostegia Donnell-Smithii Cogn. in DC. Monogr. Phan. 7: 700. 1891. Cartago, 1,300 meters, *Cooper 327*. Regions of Cartago and San Ramón, in forest, 1,200–1,850 meters. Panama. A glabrous shrub or small tree; leaves oblong-elliptic or elliptic, slender-petiolate, 7–10 cm. long, caudate-acuminate, acute at the base, 3-nerved, entire or nearly so; flowers 7-parted, the panicles rather small and few-flowered, the pedicels 5–8 mm. long; buds ovoid, 7–8 mm. long, short-acuminate; petals yellowish.

Conostegia extinctoria (Bonpl.) D. Don. Reported from Boruca (*Tonduz 3801*) and Lagarto, Diquís Valley (*Tonduz*). Colombia. A shrub or small tree, the branches furfuraceous-tomentose; leaves short-petiolate, oblong-lanceolate, 10–20 cm. long, long-

acuminate, almost rounded to subacute at the base, 5-plinerved, obsoletely sinuate-denticulate, sparsely furfuraceous-puberulent beneath on the nerves; panicles many-flowered, the flowers sessile, 5–6-parted; buds 7 mm. long, 4 mm. broad, obtusely subacuminate, densely furfuraceous-tomentose. I have seen no Costa Rican material referable to this species.

Conostegia lasiopoda Benth. Bot. Voy. Sulph. 96. 1844. Cocos Island, *Barclay*. Endemic on Cocos Island. Branches and petioles setose; leaves oblong-elliptic, 12–20 cm. long, long-acuminate, acute at the base, entire or nearly so, short-petiolate, 5-nerved, furfuraceous-puberulent beneath on the nerves, elsewhere glabrous; panicles narrow and rather few-flowered, the flowers sessile, inconspicuously bracteate; buds subconic, 9 mm. long, 5 mm. wide, acuminate, densely furfuraceous.

Conostegia macrantha O. Berg ex Triana, Trans. Linn. Soc. 28: 97. 1871. Candelaria, *Oersted 12* (photo. of type seen, ex herb. Copenhagen). Frequent in forests at middle or rather high elevations, chiefly at 1,400–2,500 meters. Endemic. A stout shrub or small tree, the young branches, petioles, and lower leaf surface more or less furfuraceous-puberulent, otherwise glabrous; leaves large, long-petiolate, ovate-oblong to elliptic, mostly 10–25 cm. long, abruptly short-acuminate, acute or obtuse at the base, 5-plinerved, entire or nearly so; flowers 9–10-parted, the panicles large and pyramidal, 15–20 cm. long, the pedicels elongate; buds globose, rounded and apiculate at the apex, 12–13 mm. broad, somewhat verruculose; stamens 25–36.

Conostegia montana (Swartz) D. Don. Reported from Sarapiquí, *Biolley 6910*. Guatemala, Jamaica, and Trinidad; no Costa Rican material seen by the writer. A glabrous shrub or small tree; leaves oblong or oblong-lanceolate, 7–10 cm. long, obtusely acuminate, acute at the base, 5-plinerved, entire; flowers 5-parted, the panicles few-flowered, 4–8 cm. long; buds acute, 6–8 mm. long, 2.5–3 mm. wide; petals retuse.

Conostegia Montealegreana Cogn. in DC. Monogr. Phan. 7: 1189. 1891. Carrillo, at 300 meters, *Pittier*. Region of San Ramón, at 1,000 meters. Endemic. A shrub 1–2 meters high, glabrous throughout or nearly so; leaves on very short petioles, oblong or lance-oblong, mostly 12–18 cm. long, narrowly long-acuminate, rounded to subacute at the apex, obscurely 5-plinerved, obscurely denticulate; panicles small and few-flowered, the flowers capitate at

the ends of the few stout branches, the bracts large, purple, closely investing the heads; buds ovoid, 5–6 mm. long, 3 mm. thick, acutish or obtuse; petals deeply emarginate. In appearance this species is remarkably unlike other members of the genus, because of the conspicuously bracted flower heads, which are rather large and terminate the umbellately disposed branches of the panicle.

Conostegia Oerstediana O. Berg ex Triana, Trans. Linn. Soc. 28: 98. 1871. *Mariquita, Cantarillo.* Turrialba and Naranjo, *Oersted.* Frequent in forests of the central region, also in the upper part of the Atlantic tierra caliente; region of San Ramón; at 900–1,800 meters. Panama. A shrub or tree of 3–8 meters, glabrous throughout; leaves thick, usually rather long-petiolate, ovate to elliptic, mostly 10–16 cm. long, short-acuminate, rounded to subacute at the base, 5-plinerved, remotely denticulate or almost entire; flowers 8-parted, fragrant, white, the panicles pyramidal, many-flowered; buds apiculate, globose, 6–8 mm. in diameter, smooth.

Conostegia Pittierii Cogn. Bull. Soc. Bot. Belg. 27, pt. 2: 176. 1888. *Escobillo.* Alto del Roble, 1,800–2,000 meters, *Pittier.* Common in moist forests of the central region, chiefly on the Pacific slope, at 1,200–2,500 meters; region of San Ramón. Endemic. A rather slender tree of 6–12 meters, glabrous throughout; leaves slender-petiolate, oblong-lanceolate or oblong-elliptic, mostly 5–10 cm. long, narrowly long-acuminate, attenuate at the base, 3-plinerved, entire or nearly so; flowers 6-parted, white, fragrant, the panicles corymbiform and few-flowered, the pedicels slender and elongate; buds acutely long-acuminate, subtruncate at the base, 10–12 mm. long, 5 mm. thick. The tree is a handsome one because of its abundance of rather showy flowers. Var. *brevifolia* Cogn. in DC. Monogr. Phan. 7: 704. 1891 appears to be a form of slight systematic importance, differentiated chiefly by having leaves somewhat smaller than those of the type. It was described from Volcán de Barba.

Conostegia puberula Cogn. in DC. Monogr. Phan. 7: 703. 1891. The type is from Chontales, Nicaragua, but the species was based in part also upon material collected at San Miguel by Wendland. Frequent in forests of the Atlantic tierra caliente, also about La Palma de San José, and in the region of San Ramón, at 1,500 meters or less. Nicaragua to Panama. A shrub or a tree with rounded crown, 3–12 meters high, the younger branches sparsely furfuraceous; leaves short-petiolate, oblong or elliptic-oblong, mostly 10–15 cm. long, short-acuminate, acute at the base, 5-plinerved, obscurely

undulate-denticulate, somewhat furfuraceous beneath, at least on the nerves; panicles mostly many-flowered and pyramidal; flowers 6-parted, fragrant; buds furfuraceous-puberulent, 8–10 mm. long, 4–5 mm. thick.

Conostegia rhodopetala Donn. Smith, Bot. Gaz. 42: 295. 1906. In forest at La Palma de San José, 1,500–1,800 meters, *Tonduz 9702*. Frequent in humid forests of the central volcanoes, at middle or rather high elevations. Endemic. A glabrous tree with rounded crown; leaves slender-petiolate, oblong-lanceolate to elliptic, mostly 15–20 cm. long, shortly caudate-acuminate, acute or obtuse at the base, 3-plinerved, entire; panicles large, pyramidal, rather lax, many-flowered, the flowers 6-parted, long-pedicellate; buds 9 mm. long, 3 mm. thick, narrowed and rostrate at the apex; petals pink or white.

Conostegia setifera Standl., sp. nov.—Frutex vel arbor, ramulis crassis, novellis densissime pilis longis patentibus vel reflexis substramineis crassiusculis setosis, internodiis brevibus; folia majuscula petiolata pergamentacea, petiolo crassiusculo 3–5 cm. longo ut ramulis setoso vel serius glabrato; lamina elliptica vel late elliptica 12–18 cm. longa 6–11 cm. lata, apice obtusa vel subrotundata et breviter caudato-acuminata, basi acuta vel obtusa, 5-plinervia, nervis superioribus alte supra basin laminae insertis, subintegra, supra glabra, subtus paullo pallidior tantum ad nervos minute furfuraceo-puberula aliter glabra, in statu juvenili ad nervos sparse setosa; paniculae breviter vel longius pedunculatae parvae multiflorae usque 7 cm. longae, floribus ad apices ramorum glomeratis sessilibus, bracteis parvis; alabastra globosa 8–9 mm. diam. apice late rotundata mutica, sparse inconspicue tuberculata subdense minute stellato-furfuraceo-puberula.—Los Angeles de San Ramón, camino de la finca Johanson, March, 1928, *Brenes 6041* (type in Herb. Field Mus.), *13582*. Cataratas de San Ramón, in 1931, *Brenes 13652*. Recognizable by the combination of long-setose branches and sessile flowers.

Conostegia speciosa Naud. Occasional in thickets and forest of the Pacific slope, ranging from the coast to about 1,400 meters. Mexico to Venezuela. A shrub 2–4 meters high, the branches very densely stellate-hirtellous with violet hairs; leaves short-petiolate, oblong-ovate or oblong-elliptic, mostly 10–20 cm. long, short-acuminate, rounded or obtuse at the base, 5-plinerved, dentate to subentire, hirtellous above, stellate-tomentose beneath; panicles many-flowered, small and dense, the flowers 6-parted, pink; buds ovoid, acute, 5–6 mm. long, 4 mm. thick, densely long-hirsute.

Conostegia subcrustulata (Beurl.) Triana. Frequent in thicket and forest of the tierra caliente, ascending to 1,000 meters; region of San Ramón. Nicaragua to Panama. A rather stout shrub 1.5–4 meters high, the young branches covered with a very dense and close, pale, stellate, furfuraceous tomentum; leaves thin, petiolate, ovate or rounded-ovate, mostly 10–20 cm. long, acute or short-acuminate, rounded or subcordate at the base, 7–11-plinerved, dentate, thinly setulose above, sparsely or often densely furfuraceous-puberulent beneath; panicles rather large and many-flowered, dense, the flowers subsessile; buds acute, furfuraceous-puberulent, 4 mm. long; petals pink. Easily recognized within the genus by the numerous nerves of the leaves.

Conostegia superba (Bonpl.) D. Don. Santo Domingo de Golfo Dulce, Pacific coast. Extending to Mexico, and in Jamaica. A glabrous shrub of 5 meters or less; leaves large, long-petiolate, ovate-oblong to broadly elliptic, 15–30 cm. long, short-acuminate, rounded or obtuse at the base, 5-plinerved, subentire; panicles large and lax, many-flowered, the flowers short-pedicellate; buds acute, 6–7 mm. long, 3–3.5 mm. thick; petals white, emarginate, 5–6 mm. long.

Conostegia tenuifolia Donn. Smith, Bot. Gaz. 27: 334. 1899. Forests near Shirores, Talamanca, 100 meters, *Tonduz 9339*. Frequent in the Atlantic tierra caliente; forests of the region of San Ramón, at 1,300 meters or less. Endemic. A slender shrub of 2–3 meters, the young branches, petioles, and peduncles stellate-puberulent; leaves on rather short petioles, oblong to oblong-elliptic or obovate, mostly 10–18 cm. long, shortly caudate-acuminate, acute or obtuse at the base, 5-plinerved, glabrous, entire; panicles corymbiform, large or small, many-flowered, the flowers pedicellate; petals usually 6; buds ovoid, subtruncate at the base, 8–9 mm. long, mucronate, stellate-puberulent.

Conostegia vulcanicola Donn. Smith, Bot. Gaz. 42: 295. 1906. Forests of El Achiote, southern slope of Volcán de Poás, 2,200 meters, *Tonduz 10836*. Endemic; not seen by the writer. Plants stellulate-pubescent; leaves short-petiolate, lance-elliptic, 8–14 cm. long, acuminate at each end, 5-plinerved, setuliferous on the margins, glabrate above, pubescent beneath on the nerves and veins; panicles pyramidal, trichotomous, pubescent, the flowers short-pedicellate, 5–6-parted; buds oblong-ovoid, apiculate, constricted at the middle, 5–6 mm. long, erostrate, puberulent or glabrate.

Conostegia xalapensis (Bonpl.) D. Don. *Lengua de vaca, Lengua de gato. C. lanceolata* Cogn. in DC. Monogr. Phan. 7: 708. 1891 (San José, *Wendland 639*); *C. lanceolata* var. *subtrinervia* Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 253. 1891 (type Costa Rican). Common in thickets, forest, and pastures of the central region, chiefly in the tierra templada but descending into the upper part of the Atlantic tierra caliente, and on the Pacific slope almost or quite to the coast; region of San Ramón. Mexico to Colombia, and in Cuba. A shrub or often a tree with a broad, spreading crown, as much as 8 meters high, the branches densely stellate-tomentulose; leaves short-petiolate, lance-oblong to ovate-oblong, mostly 8–15 cm. long, acuminate, acute to rounded at the base, 5-plinerved, denticulate, green and glabrate above, covered beneath with a fine, very dense, whitish or rusty, stellate tomentum; panicles mostly small, many-flowered, and dense, the flowers subsessile, 5-parted; buds 4–5 mm. long, acute or acutish, densely tomentulose. This is probably the most frequent woody representative of the Melastomaceae in Central America, and it is abundant in the region of San José, especially in hedges and pastures. The rather large, dark purple fruits are very juicy and of good flavor, and often are eaten. In flavor and appearance they suggest blueberries (*Vaccinium*), and they are of such quality as to be offered sometimes for sale in the markets. *C. lanceolata* differs from the typical Mexican form with round-based leaves principally in having somewhat narrower leaves that are acute at the base. It seems altogether impossible to separate the ample material available for study into two distinct forms, and I am of the opinion that *C. lanceolata* is not even a good variety of *C. xalapensis.*

The genus *Henriettea* probably is represented in Costa Rica, since species of the genus are found in both northern and southern Central America.

HENRIETTELLA Naud.

Shrubs or small trees, glabrous or pubescent; leaves mostly petiolate and subcoriaceous, usually acuminate, entire or serrulate, 3–5-nerved or 3-plinerved; flowers small, fasciculate chiefly at leafless nodes, pedicellate or subsessile, commonly 5-parted; calyx tube campanulate, truncate or shallowly lobate, the lobes often with minute outer teeth or tubercles; petals usually acute or acuminate; stamens normally 10, equal, the filaments filiform, glabrous, the

anthers alike, short, obtuse, recurved, erostrate, 1-pored at the apex, the connective not produced at the base, not appendaged; ovary 4–5-celled; fruit baccate, the seeds irregularly obovate-angulate.—At least two other species are known from Central America.

Henriettella fascicularis (Swartz) Triana. Reported from Boruca and Buenos Aires, Pacific coast. Extending to British Honduras and the Greater Antilles. A shrub or small tree, the young branches and petioles densely hirsute; leaves short-petiolate, oblong or oblong-elliptic, 8–12 cm. long, acutish, attenuate and acute at the base, 5-plinerved, scarcely ciliate, hirtellous and very rough to the touch; flowers 4-parted, densely fasciculate, the pedicels 3–6 mm. long; calyx campanulate, 3 mm. long; petals white, long-acuminate; fruit globose, blackish, 5–6 mm. in diameter.

Henriettella Seemannii Naud. Reported from Térraba and Buenos Aires, Pacific tierra caliente. Panama. Young branches and petioles appressed-setose; leaves petiolate, oblong, 8–11 cm. long, acute, rounded at the base, the margin long-ciliate, sparsely short-setulose on the upper surface; flowers 5-parted, the pedicels very short; calyx narrowly campanulate, densely strigose, the tube 4 mm. long, the lobes obtuse, 1 mm. long; petals 4–5 mm. long.

Henriettella tuberculosa Donn. Smith, Bot. Gaz. 27: 335. 1899. *H. costaricensis* Kraenzl. Vierteljahr. Naturf. Gesell. Zürich 76: 158. 1931 (based on the same collection as *H. tuberculosa*). Talamanca, forests of Tsaki, *Tonduz 7263* (*9606* in Herb. Nac. C. R.). Reported also from El General; region of San Ramón. A shrub, the branches scabrous; leaves short-petiolate, oblong-obovate or oblong-elliptic, 5–12 cm. long, narrowly long-acuminate, attenuate at the base, entire, 5-plinerved, tuberculate on the upper surface, foveolate beneath and strigose on the nerves; flowers 5-parted, the pedicels very short; calyx 2 mm. long, paleaceous-strigose, minutely denticulate; petals 2 mm. long, obtuse.

HETEROCENTRON Hook. & Arn.

Plants herbaceous or suffrutescent, mostly erect, pubescent or glabrate; leaves small, membranaceous, penninerved or multiplinerved; flowers 4-parted, usually paniculate, white to purple; calyx setose, the tube ovoid to hemispheric, the lobes acute, triangular, equaling the tube; petals obtuse, subretuse, or apiculate; stamens 8, very unequal, the filaments glabrous, the anthers dissimilar, incurved, linear-oblong or subulate, 1-pored at the apex, the cells undulate;

connective of the larger anthers long-produced below the cells, with a long, clavate appendage; ovary 8-costate, 4-celled, glabrous or setose; fruit capsular, the seeds cochleate.—One or more additional species are found in Central America.

Heterocentron glandulosum Schenck. In thickets, regions of San José and San Ramón, at 1,000–1,200 meters. Extending to Guatemala. Plants erect, about 60 cm. high, densely short-setulose; leaves ovate to elliptic, mostly 3–5 cm. long, acute at each end, 11–15-plinerved, entire, densely pubescent; flowers white, forming a large, terminal panicle; calyx glandular-setulose, the tube 3 mm. long; petals 6–8 mm. long. The Costa Rican plant has been reported under the name *Heeria axillaris* Cogn., a species which ranges from Mexico to Nicaragua.

HETEROTRICHUM DC.

Slender shrubs, commonly hispid and often glandular; leaves large, petiolate, oblong to ovate-cordate, many-nerved, entire or serrulate; flowers 5–9-parted, rather large, in terminal or rarely lateral panicles; calyx hispid or glandular-pilose, the tube campanulate or globose, the lobes usually appendaged dorsally with subulate teeth; petals obtuse or rounded at the apex; stamens twice as many as the petals, equal, the filaments filiform, glabrous, the anthers linear-oblong or subulate, 1-pored at the apex, the connective not produced at the base, not appendaged; ovary 6–12-celled; fruit baccate, the seeds minute, ovoid, rarely angulate or pyramidal.—There probably are no other species in Central America.

Heterotrichum globuliflorum Cogn. Bull. Soc. Bot. Belg. 27, pt. 2: 176. 1888. Alto del Roble, 2,000 meters, *Pittier*. Endemic. Pubescence eglandular; leaves ovate, 8–12 cm. long, short-acuminate, rounded at the base, 7-nerved, sparsely setulose, especially on the upper surface; cymes pedunculate, compact, globose, many-flowered, the flowers subsessile.

Heterotrichum octonum (Bonpl.) DC. Frequent in forest and thickets of the tierra caliente; region of San Ramón; at 950 meters or usually less. Mexico to West Indies and Peru. A shrub, usually 1–2 meters high, the branches, petioles, and calyces densely or sparsely setulose with simple or glandular hairs, also stellate-tomentose; leaves rather long-petiolate, cordate-ovate, 10–20 cm. long, short-acuminate, 7–9-nerved, denticulate, hispidulous above, stellate-tomentose beneath; flowers 8-parted, in small panicles; calyx tube

4–5 mm. long, the inner lobes short and obtuse, the outer ones 2–3 mm. long; petals white, 8–9 mm. long; fruit 7–8 mm. long.

LEANDRA Raddi

Shrubs or small trees, commonly pilose or setulose; leaves mostly petiolate, entire or serrulate, 3–9-nerved; flowers 4–7-parted, chiefly 5-parted, paniculate, small, the panicles terminal; calyx tube globose to urceolate, the limb dentate or lobate, the teeth usually 2-seriate, the outer teeth subulate or tuberculiform, the inner membranaceous and more or less connate with the outer ones; petals lanceolate to subulate, acute or acuminate; stamens twice as many as the petals, equal or unequal, the filaments subulate or filiform, glabrous, the anthers small, linear or linear-oblong, straight or recurved, 1-pored at the apex, the connective not or scarcely produced below the cells, not or obscurely appendaged; ovary commonly 3–5-celled; fruit baccate; seeds ovoid-angulate, obcuneate, or globose.—A few other species are represented in Central America.

Leandra cornoides (Schlecht. & Cham.) Cogn. Reported from El Achiote, 2,200 meters, *Tonduz 10837*. Extending to Mexico. A shrub about a meter high, the young branches thinly furfuraceous-puberulent; leaves slender-petiolate, oblong, 5–10 cm. long, short-acuminate, rounded at the base, 5–7-plinerved, glabrous or beneath sparsely furfuraceous-puberulent; panicles 4–6 cm. long, the pedicels 1–10 mm. long; calyx glabrous, the tube 3 mm. long, the teeth very short; petals pink, lanceolate, 5–6 mm. long; fruit globose, 4–5 mm. in diameter.

Leandra costaricensis Cogn. in DC. Monogr. Phan. 7: 658. 1891. *Lengua de vaca*. Cartago, 1,300 meters, *Cooper 181*. Frequent in forests at middle and upper elevations, chiefly at 1,300–2,000 meters. Probably endemic. A slender shrub of 1.5–4 meters, the younger branches, petioles, and panicles stellate-furfuraceous and short-hirtellous; leaves ovate-oblong to ovate-elliptic, mostly 10–15 cm. long, short-acuminate, rounded or subemarginate at the base, sparsely setulose above, sparsely short-setulose beneath on the nerves, 5-nerved; panicles small or large, lax and many-flowered, the flowers almost sessile; calyx scarcely furfuraceous, sparsely short-hirtellous, the tube 2 mm. long. *L. costaricensis* var. *angustifolia* Cogn. (in DC. Monogr. Phan. 7: 1187. 1891; San Lorenzo de Dota, 1,250 meters, *Pittier 2269*) with ovate-lanceolate leaves, and *L. costaricensis* var. *hirsutior* Cogn. (loc. cit.; Alajuelita, 1,130 meters, *Pittier 2394*) with

longer and more abundant pubescence, appear to be forms of no special systematic significance.

Leandra dichotoma (D. Don) Cogn. Frequent in thickets of the Atlantic tierra caliente; region of San Ramón; at 900 meters or less. Guatemala to Brazil and Bolivia. A slender shrub of 1–3.5 meters, the branches very densely hirtellous with spreading hairs; leaves long-petiolate, ovate, long-acuminate, rounded at the base, 7–9-nerved, densely villous-hirtellous beneath; panicles large and many-flowered, mostly 10–20 cm. long; calyx densely hirtellous, the tube 2.5 mm. long; petals white; fruit 4–5 mm. in diameter.

Leandra fulva Cogn. in DC. Monogr. Phan. 7: 658. 1891. Without definite locality, at 3,000 meters, *Wendland*. Regions of Navarro and San Ramón, 1,100–1,500 meters. Also in Guatemala. A slender shrub of 1.5–2 meters, the branches, peduncles, and petioles densely stellate-puberulent and short-hirtellous; leaves long-petiolate, oblong-ovate, narrowly long-acuminate, rounded at the base, 5-nerved, sparsely setulose above, sparsely hirtellous beneath, especially on the nerves; panicles small or large, the flowers almost sessile; calyx densely furfuraceous and short-hirtellous, the tube 2.5 mm. long; petals white; fruit 3 mm. in diameter.

Leandra grandifolia Cogn. in DC. Monogr. Phan. 7: 690. 1891. San Miguel, *Wendland*. Reported from the tierra caliente of both coasts. Endemic. A slender shrub, the branches appressed-hirsute; leaves long-petiolate, ovate, 15–25 cm. long, short-acuminate, rounded or subemarginate at the base, 7–9-nerved, sparsely setulose above, rather sparsely short-pilose beneath; panicles terminal and axillary, 10–15 cm. long; calyx tube 1.5–2 mm. long.

Leandra lasiopetala Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 249. 1891. Forests of Las Pavas, Reventazón Valley, *Pittier 3149*. Reported also from Ríos La Unión and Convento, San Miguel, and Cuesta de Los Huevos. Endemic. Branches densely hirsute with retrorse, appressed hairs; leaves ovate, short-acuminate, sparsely short-setulose above, sparsely short-pilose beneath, 7–9-nerved; outer calyx teeth half as long as the tube.

Leandra mexicana (Naud.) Cogn. Reported from Buenos Aires, Pacific tierra caliente. Mexico to Panama. A slender shrub 1–2 meters high, the young branches, petioles, and inflorescence densely glandular-pilose; leaves ovate, short-acuminate, more or less cordate at the base, densely velutinous-pilose on both surfaces,

dentate; panicles large and lax, the flowers 7-parted, sessile; calyx tube 3 mm. long; fruit violet, 5 mm. in diameter.

Leandra retropilosa Cogn. Reported by Cogniaux from Costa Rica (*Polakowsky 506*), without definite locality. Nicaragua to Brazil. Branches appressed-hirsute; leaves oblong, 8–12 cm. long, long-acuminate, rounded at the base, 5-nerved, sparsely short-setulose above, rather sparsely short-pilose beneath; panicles 5–15 cm. long; calyx tube 2.5 mm. long, the teeth 1–1.5 mm. long; fruit 4 mm. in diameter.

Leandra subseriata (Naud.) Cogn. *Lengua de vaca.* Reported from Río Segundo, also as collected by Oersted without special locality. Guatemala to Ecuador. Young branches very densely stellate-tomentose and sparsely long-hirtellous; leaves ovate-oblong, 8–12 cm. long, short-acuminate, rounded or subemarginate at the base, 7-nerved, setulose and stellate-furfuraceous on the upper surface, densely stellate-tomentose beneath; panicles rather small, the flowers sessile; calyx densely stellate-furfuraceous, the tube 2 mm. long, the outer teeth very short, acute; fruit 4 mm. in diameter.

MAIETA Aubl.

Shrubs or small trees; leaves conspicuously dimorphic, the larger one of each pair bearing a formicarium; flowers solitary and sessile or few and short-pedunculate, axillary, 5-parted; calyx tube obconic to campanulate, glandular-hirsute, the teeth semiorbicular, with small exterior teeth; petals obtuse; stamens equal.—No other species are known from Central America.

Maieta Poeppigii Mart. Cocos Island. British Guiana, Brazil, and Peru. Plants low and suffrutescent, the branches furfuraceous and sparsely hirsute; leaves short-petiolate, oblong or oblong-lanceolate, the larger ones 9–12 cm. long, short-acuminate, obtuse at the base, 5-plinerved, each with an inflated formicarium at the base; flowers pedicellate, in few-flowered cymes; calyx tube 4–5 mm. long; petals white; fruit cream-colored, 6–7 mm. in diameter.

MICONIA Ruiz & Pavón

Shrubs or trees; leaves usually petiolate, entire or dentate; flowers rather small, 4–8-parted, normally 5-parted, in terminal or very rarely lateral panicles or corymbs, rarely glomerate or spicate, most often white, short-pedicellate or sessile, sometimes secund on the branches; calyx tube urceolate, campanulate, or globose, the limb

truncate or lobate, the lobes short, not appendaged externally or the appendages punctiform or minute; petals obovate or oblong, obtuse or retuse; stamens equal or nearly so, the filaments subulate or filiform; anthers polymorphous, short or elongate, commonly linear, oblong, or subulate, 1–2–4-pored at the apex, the connective usually short-produced below the cells, anteriorly biauriculate or bituberculate; ovary 2–5-celled; fruit baccate, usually globose; seeds pyramidal or angulate, rarely ovoid, generally smooth and lustrous.—The largest genus of the family, with 600 or more species. Numerous species besides those listed here are found in other parts of Central America. The plants often form a conspicuous element of the undergrowth in the forests, and some species grow abundantly in cut-over or formerly cultivated land. The fruits often are juicy and edible.

Miconia aeruginosa Naud. *Lengua de vaca, Terciopelo de Santa María.* Common in thickets and hedges at middle elevations on both watersheds, particularly in the Meseta Central, mostly at 1,000–1,500 meters; region of San Ramón. Southern Mexico to Venezuela. A shrub 1–3 meters high, the young branches densely hirsute; leaves on rather short petioles, broadly to narrowly ovate, mostly 15–20 cm. long, long-acuminate, rounded or shallowly cordate at the base, 5–7-nerved, denticulate, thin, densely long-pilose on the upper surface, densely hirtellous beneath; inflorescence a small or large panicle, the flowers arranged in long and slender, dense spikes; calyx obscurely lobate, 2–2.5 mm. long, sparsely hirsute; petals white, broadly obovate, retuse, 1.5–2 mm. long. The plant is a common shrub in many places about San José. It is somewhat variable, and it is probable that the material referred here at present represents two distinct species, distinguishable by pubescence.

Miconia albicans (Swartz) Triana. Regions of Boruca and Buenos Aires, Pacific tierra caliente; Páramos del Abejonal, 1,900 meters. Guatemala to West Indies and Paraguay. A stout, stiff shrub 1–2 meters high, the young branches, petioles, and inflorescence very densely and minutely white- or rufous-tomentulose; leaves short-petiolate, coriaceous, ovate-oblong, mostly 7–13 cm. long, acute or subobtuse, rounded or shallowly cordate at the base, 5-nerved, glabrous and shining above, at least in age, covered beneath with a very dense, minute, pale tomentum; flowers small, secund along the branches, in rather small, thyrsiform panicles; calyx tube shallowly 5-lobate, 2.5–3 mm. long; petals white, subretuse, 2.5 mm. long; fruit dark blue, 4 mm. in diameter, 10-costate. Although in Costa Rica this species appears to be confined to the tierra caliente, prob-

ably to savanna regions, in other parts of Central America, as in Honduras, it ascends to middle elevations, and is found there abundantly in regions of pine forest. In Honduras this species is called Cirín and Negrito.

Miconia argentea (Swartz) DC. *Santa María, María.* Frequent in thickets or forest of the Pacific slope, chiefly in the tierra caliente but ascending sometimes to 1,400 meters; Guanacaste; region of San Ramón. Southern Mexico to Panama. A shrub or more often a tree, sometimes 10 meters high, with spreading crown; young branches strongly compressed, very densely and minutely pale-tomentulose like the petioles and branches of the inflorescence; leaves petiolate, subcoriaceous, oblong-ovate to rounded, mostly 10–25 cm. long, abruptly short-acuminate, rounded or obtuse at the base, denticulate, 5-nerved, bright green, glabrous, and lustrous above, covered beneath with a minute but very dense, white tomentum; panicles large and much branched, pyramidal; calyx 10-costate, 1.5–2 mm. long; petals white, 2 mm. long; fruit about 3 mm. in diameter. A conspicuous and handsome tree, plentiful in some localities. When the tree is blown by the wind, the white under surfaces of the leaves are exposed, so that it appears to be covered with white flowers. In Panama the name Oreja de mula is applied to this species. Pittier lists the Térraba name of Shorka-krá.

Miconia astroplocama Donn. Smith, Bot. Gaz. 42: 295. 1906. In forest, Tuis, Prov. Cartago, 650 meters, *Tonduz 11438.* Las Vueltas de Tucurrique; probably frequent in the Atlantic tierra caliente. Endemic(?). A tree as much as 9 meters high with a rounded crown, the young branches, petioles, and branches of the inflorescence covered with a very dense, soft, stellate, brownish tomentum, some of the hairs stipitate; leaves short-petiolate, coriaceous, oblong-obovate or elliptic-oblong, mostly 20–30 cm. long, abruptly short-acuminate, acutish or obtuse at the base, 5-nerved, entire, lustrous and glabrous above, covered beneath with a dense, yellowish, stellate tomentum; panicles large and much branched, the flowers sessile or short-pedicellate, glomerate; calyx 4.5 mm. long, the limb with small, rounded lobes; petals 3 mm. long; fruit 5 mm. in diameter, stellate-pilose.

Miconia atrosanguinea Cogn. Bot. Jahrb. 8: 23. 1886. *Acinodendrum atrosanguineum* Kuntze, Rev. Gen. 950. 1891. Between Desengaño and Cariblanco, *Wendland.* Frequent in humid forests of the central region, chiefly at 1,300–2,500 meters, abundant in

some localities, especially at rather high elevations; region of San Ramón. Also in Panama. A slender shrub 1–2.5 meters high, the branches, petioles, peduncles, and calyces long-hirsute with spreading hairs; leaves on long, slender petioles, thin, ovate or oblong-ovate, mostly 5–10 cm. long, long-acuminate, rounded at the base, entire or nearly so, bright green, sparsely setulose on both surfaces; inflorescence of a rather dark but bright red, long-pedunculate, usually pendent, laxly branched, the flowers long-pedicellate; calyx tube 4 mm. long, the teeth triangular, 1–2 mm. long; petals 5–6 mm. long. A handsome although not especially conspicuous shrub, on account of the bright red flowers, of a color unique in the genus, so far as it is represented in Central America. A frequent and characteristic plant of the wet forests on the upper slopes of the central mountains.

Miconia barbinervis (Benth.) Triana. Reported from several localities in the tierra caliente. Nicaragua to Trinidad, Brazil, and Peru. A shrub 2 meters high, the branches, petioles, and panicles densely long-hirsute with fulvous hairs; leaves narrowly ovate or elliptic-oblong, 12–20 cm. long, long-acuminate, cuneate or subobtuse at the base, 3–5-nerved, repand-denticulate, densely long-pilose on the upper surface, long-hirsute beneath on the nerves, elsewhere hirtellous; panicles sparsely branched, 5–15 cm. long, the sessile flowers in dense heads at the ends of the branches; calyx densely hirsute with long, branched, eglandular hairs 3–4 mm. long; petals retuse, 3 mm. long, glabrous; fruit 4 mm. in diameter.

Miconia Beurlingii Triana. Suretka, Talamanca Valley. Panama, Trinidad, and Venezuela. A shrub, the branches obtusely tetragonous, the young branches, petioles, and panicles minutely punctate-furfuraceous; leaves on very short petioles, thin, oblong to ovate-oblong, mostly 14–20 cm. long, acuminate, acute at the base, 5-nerved, almost entire or undulate-denticulate, stellate-punctate beneath; panicles broadly pyramidal, 5–10 cm. long, the flowers glomerate; calyx 1.5–2 mm. long, minutely 5-denticulate; petals obovate, subretuse, 1.5 mm. long; fruit blue-black, 3 mm. in diameter.

Miconia biperulifera Cogn. in DC. Monogr. Phan. 7: 911. 1891. Slopes of Volcán Poás, 2,460 meters, *Pittier*. Slopes of Poás and Irazú, 2,000–2,700 meters, growing in wet forest. Endemic. A small, densely branched tree, 6–7 meters high, the branches, petioles, and panicles densely brownish-stellate-furfuraceous; leaves slender-petiolate, subcoriaceous, broadly elliptic to oblong-elliptic,

2.5–5.5 cm. long, shortly obtuse-acuminate, obtuse or acute at the base, 3-plinerved, remotely denticulate, glabrous above, green and sparsely furfuraceous beneath; panicles small but many-flowered, erect, 4–6 cm. long; calyx sparsely furfuraceous, 2 mm. long; fruit globose, 6 mm. in diameter. Var. *rigida* Cogn. (in DC. Monogr. Phan. 7: 1192. 1891) is a form of little importance, apparently, with small leaves and smaller panicles; its type is from Potrero del Alto, Volcán Poás, *Pittier*.

Miconia borealis Gleason. *Resino.* Thickets or forests of the Pacific tierra caliente, at 1,000 meters or less; ascending to the region of San Ramón. Southern Mexico to Cuba and Panama. A slender shrub or tree, sometimes 10 meters high, glabrous almost throughout; leaves short-petiolate, firm, blackish when dried, oblong-lanceolate, 8–10 cm. long, narrowly long-acuminate, subacute to almost rounded at the base, entire or nearly so, 3-nerved or obscurely 5-nerved; panicles small but much branched and many-flowered, 5–10 cm. long; calyx 1.5 mm. long, the teeth minute; petals white. The plant has been reported from Costa Rica incorrectly as *M. minutiflora* (Humb. & Bonpl.) DC.

Miconia Brenesii Standl., sp. nov.—Frutex gracilis 3–4-metralis, ramis juvenilibus sparse vel dense ferrugineo-stellato-furfuraceis, cito glabratis, internodiis brevibus; folia parva graciliter petiolata membranacea in sicco laete viridia, petiolo 5–20 mm. longo sparse vel dense furfuraceo-puberulo vel glabrato; lamina lanceolata vel elliptico-lanceolata 5.5–11.5 cm. longa 1.5–4 cm. lata longe anguste attenuato-acuminata, basi acuta vel attenuata, integra vel minute denticulata, 3–5-plinervia, nervis interioribus alte supra basin laminae nascentibus, supra glabra, subtus ad nervos minute brunneo-furfuracea; paniculae parvae numerosae pyramidales vel corymbiformes vix ad 4 cm. longae laxe multiflorae, ramis gracillimis sparse minute furfuraceis vel fere glabris, bracteis parvis oblongis vel subtriangularibus viridibus saepissime patentibus, pedicellis 1–2 mm. longis; calyx campanulatus glaber vel obscure minutissime furfuraceus viridis 1.5 mm. longus, limbo brevissime late remote denticulato; petala alba late oblonga 2 mm. longa apice rotundata vel obtusa, erecta; antherae oblongae vix 1 mm. longae apice uniporosae; stylus glaber 3–4 mm. longus, stigmate parvo capitato.—Santiago de San Ramón, January, 1937, *Brenes 21981* (type in Herb. Field Mus.). El Silencio (Los Angeles) de San Ramón, *Brenes 17082*. Alto de La Palma de San Ramón, 1,250 meters, *Brenes 3812*. La

Palma de San Ramón, 1,100–1,275 meters, *Brenes 6742, 6782, 5156, 6768, 5232, 11903, 15049.*

Miconia calvescens DC. Tuis; Las Vueltas, Tucurrique; at about 650 meters. Chiapas to Paraguay and Argentina. A small tree; branches, petioles, peduncles, and calyces rather densely covered with small, appressed, grayish, stellate hairs; leaves very large, rather thin, on short or long petioles, rounded-obovate to obovate-oblong, 15–40 cm. long, acute or abruptly short-acuminate, rounded to subcordate at the base, membranaceous, repand-denticulate or entire, 5-nerved, at first sparsely and minutely stellate-furfuraceous but soon glabrate; panicles large and pyramidal, 20–50 cm. long, the flowers crowded into small, dense heads at the tips of the branchlets; calyx 3 mm. long, the limb subentire; petals white, 2–2.5 mm. long; fruit 10-costate, 4 mm. in diameter.

Miconia carnea Cogn. Bot. Jahrb. 8: 28. 1886. Near San Isidro, *Lehmann 1809.* Related to *M. biperulifera;* branches obtusely tetragonous, the younger branches, petioles, panicles, and calyces densely stellate-furfuraceous; leaves oblong-lanceolate, short-petiolate, rather stiff, 10–15 cm. long, short-acuminate, 3-plinerved, entire; panicles pyramidal, 10–15 cm. long; calyx 2.5 mm. long, the lobes short; petals pink, rounded at the apex, 2 mm. long. Known to the writer only from the description.

Miconia caudata (Bonpl.) DC. Forest and thickets of the Pacific tierra caliente, ascending to El Abejonal; region of San Ramón. Panama and Colombia. A shrub or small tree, the slender branches, petioles, and branches of the inflorescence sparsely and finely furfuraceous-puberulent; leaves petiolate, thin and green, narrowly to very broadly ovate, mostly 15–25 cm. long, abruptly caudate, the tip linear and usually 2 cm. long or more, obtuse or rounded at the base, 5-nerved, entire, glabrous above, sparsely or rather densely furfuraceous-puberulent beneath or in age almost glabrous; panicles large and many-flowered, the flowers mostly pedicellate; calyx sparsely furfuraceous, distinctly lobate, 2.5 mm. long; petals pinkish, furfuraceous outside, 3 mm. long; fruit obscurely 10-costate, 4 mm. in diameter. Conspicuous because of the very long and narrow, tail-like tips of the leaves.

Miconia costaricensis Cogn. in DC. Monogr. Phan. 7: 887. 1891. Desengaño and Cariblanco, *Wendland.* Young branches, petioles, and panicles very shortly and densely hirtellous; leaves oblong, short-petiolate, 10–15 cm. long, long-acuminate, rounded

at the base, 7-plinerved, unequally dentate, setulose above, rather densely hirtellous beneath; panicles pyramidal, 7–8 cm. long, the flowers on very short pedicels; calyx hirsute, 3 mm. long, the lobes short and obtuse; petals obovate, 2 mm. long; anthers 1 mm. long. Var. *Pittierii* Cogn. op. cit. 888 (La Palma, 1,500 meters, *Pittier*) has membranaceous leaves which are densely hirtellous beneath, and slightly smaller flowers. I have seen no material of this species, but the 7-plinerved leaves should be distinctive.

Miconia cuneata Triana. Jiménez, Llanuras de Santa Clara, *J. D. Smith 4790.* Guatemala to Peru. A shrub, the young branches, petioles, and panicles densely stellate-hirsute, the hairs long and spreading, branched at the apex; leaves on very short petioles, oblong or oblong-lanceolate, mostly 15–25 cm. long, long-acuminate, attenuate to the subcordate base, 5-nerved, more or less dentate, stellate-hirsute beneath, especially on the nerves, hirsute above with simple hairs; panicles rather large, the branches stout, the flowers sessile; calyx 3 mm. long; petals 2 mm. long.

Miconia densiflora Cogn. Reported from San Marcos, *Tonduz 7738;* Candelaria, 1,900 meters, *Tonduz 7870.* Colombia. Young branches, petioles, panicles, and calyces densely stellate-furfuraceous; leaves petiolate, ovate-oblong, 12–18 cm. long, narrowly long-acuminate, rather stiff, 5-plinerved, densely and minutely stellate-pilose beneath; panicles 10 cm. long, the flowers sessile, densely glomerate; calyx 3 mm. long, minutely 5-lobate; petals 2–2.5 mm. long. Known to the writer only from the description.

Miconia desmantha Benth. of Colombia has been reported from Costa Rica, but the material so named is probably referable to *M. aeruginosa.* Material referred by Cogniaux to *M. dichotoma* Naud., apparently an unpublished name, likewise is probably *M. aeruginosa.*

Miconia dodecandra (Desr.) Cogn. *Santa María.* Frequent in thickets or forest at middle elevations on the Pacific slope, mostly at 1,000–1,400 meters; Aguacaliente; region of San Ramón. Mexico to West Indies and Brazil. A shrub or small tree, 3–7 meters high, the branches, petioles, and panicles densely covered with a pale or brownish, stellate tomentum; leaves on rather long petioles, ovate or oblong-ovate, 12–18 cm. long, rather abruptly acuminate, rounded at the base, generally 5-nerved, entire or almost so, glabrous above or nearly so, covered beneath with a very dense and close, pale brownish, stellate tomentum, somewhat coriaceous; flowers mostly

6-parted, the panicles 10–25 cm. long, many-flowered, the flowers mostly on pedicels 4–10 mm. long; calyx densely canescent-stellate-tomentose, 5–6 mm. long, the limb distinctly lobate; petals pink, 7–8 mm. long; fruit globose, 5 mm. in diameter.

Miconia dolichopoda Naud. *María.* Río Segundo, collected by Tonduz. Venezuela. Branches, petioles, panicles, and calyces densely pale-furfuraceous-puberulent; leaves long-petiolate, subcoriaceous, narrowly ovate, 8–16 cm. long, rather long-acuminate, obtuse and unequal at the base, 7-nerved, almost entire, glabrous above, beneath covered with a dense, close, pale, stellate-hirtellous tomentum; panicles pyramidal, much branched, many-flowered, the flowers 6-parted, sessile; calyx subtruncate, 3 mm. long; petals white, retuse, 1.5 mm. long.

Miconia dolichorrhyncha Naud. Reported from the region of El General. Extending to Colombia and Peru. A shrub or small tree, the branches, petioles, and panicles densely ferruginous-stellate-furfuraceous, the young branches usually compressed; leaves short-petiolate, rather thick, oblong or lance-oblong, mostly 15–20 cm. long, narrowly long-attenuate or caudate-acuminate, rounded or obtuse at the base, 5-nerved, lustrous on the upper surface and glabrous or nearly so, entire, rather densely brownish-stellate-hirtellous beneath; panicles 10 cm. long or less, much branched, with very numerous small flowers, these mostly pedicellate; calyx 1.5–2 mm. long, rather densely stellate-puberulent; petals obtuse, white, 2 mm. long.

Miconia dorsiloba Gleason, Brittonia 2: 320. 1937. Region of El General, Prov. San José, 975 meters, *Skutch 2816.* A shrub of 3 meters, the branches soft-tomentose with stipitate, stellate hairs; leaves petiolate, elliptic-oblong or narrowly ovate, membranaceous, 28 cm. long or smaller, acuminate, rounded and cordulate to acute at the base, serrulate, minutely pilose above and stellate-hispid on the nerves, softly stellate-tomentose beneath; panicles sparsely branched, 5–10 cm. long, stellate-tomentose, the flowers 5-parted, sessile and glomerate; calyx 2 mm. long, densely stellate-tomentose; petals white, 2.5 mm. long. Said to be related to *M. barbinervis.*

Miconia elata (Swartz) DC. Reported from Buenos Aires, Pacific tierra caliente, *Tonduz 4941.* Jamaica and Cuba. A shrub or small tree, the branches tetragonous, the younger ones, petioles, panicles, and calyces densely furfuraceous-hirtellous; leaves obovate-oblong, petiolate, 15–25 cm. long, abruptly acuminate, obtuse at

the base, 5-nerved, undulate-denticulate, densely stellate-hirtellous beneath; panicles pyramidal, 10–15 cm. long, the flowers sessile, congested; calyx 2 mm. long, obscurely dentate; petals broadly ovate, 1–1.5 mm. long; fruit 10-costate, 4–5 mm. in diameter.

Miconia flavida Cogn. Frequent in forests of the tierra caliente and at middle elevations on the Pacific slope; region of San Ramón. Endemic. A slender shrub 2–3.5 meters high, the young branches, petioles, and panicles minutely and sparsely furfuraceous or almost glabrous; leaves short-petiolate, membranaceous, yellow-green when dried, oblong or narrowly lance-oblong, mostly 11–22 cm. long, acuminate or long-acuminate, acute or attenuate at the base, entire or nearly so, usually 3-plinerved but sometimes 5-plinerved, glabrous or nearly so but usually sparsely and minutely furfuraceous-puberulent beneath on the nerves; panicles pyramidal, small or rather large, lax and many-flowered, the flowers mostly short-pedicellate; calyx very minutely puberulent or glabrate, subtruncate, 2.5 mm. long; petals suborbicular, glabrous; anthers oblong, 1.6 mm. long; fruit 10-costate, glabrate, 4 mm. in diameter. No description of this species has been published, but specimens so named, apparently representing an undescribed species, have been distributed to many herbaria.

Miconia flaviflora Gleason. Buenos Aires; region of Dota; El General; at 1,800 meters or less. Also in Peru. A shrub of 3–4.5 meters, the young branches, petioles, and panicles finely furfuraceous-puberulent; leaves short-petiolate, lance-oblong, 12–25 cm. long, gradually or abruptly acuminate, acute at the base, 5-plinerved, thick and firm, repand-denticulate or almost entire, glabrous above, punctate-furfuraceous beneath, especially on the nerves; panicles large, pyramidal, the flowers sessile or short-pedicellate; calyx minutely furfuraceous, 3 mm. long, the limb lobate; petals white. The Costa Rican and Guatemalan form is *M. flaviflora* var. *emigrans* Gleason, Brittonia 2: 320. 1937 (El General, 1,190 meters, *Skutch 2381*). The Costa Rican plant has been referred incorrectly to *M. obovalis* Naud.

Miconia fulva DC. Diquís, *Pittier 12119*. Ranging to the Guianas. Sometimes a tree of 10 meters, the trunk as much as 30 cm. in diameter, the crown elongate or pyramidal, the bark reddish; young branches, petioles, panicles, and lower leaf surface covered with a dense indument of golden brown, closely appressed, stellate scales; leaves opposite or 3–4-verticillate, short-petiolate, lanceolate,

10–20 cm. long, long-acuminate, acute at the base, 3-nerved, glabrous above, entire; panicles pyramidal, 10–15 cm. long, the flowers sessile, 4 mm. long; calyx 2 mm. long, denticulate, minutely stellate-tomentulose; petals white.

Miconia glaberrima (Schlecht.) Naud. Moist forests of the central mountains, 1,400–2,400 meters. Ranging to Mexico. A shrub about 2.5 meters high, glabrous throughout or nearly so, the branches obtusely tetragonous; leaves oblong, rather thick, 8–12 cm. long, acuminate, obtuse to subacute at the base, 3-nerved, entire or nearly so; panicles pyramidal, 5–7 cm. long; calyx 1.5 mm. long, hemispheric;, petals white, 1 mm. long; fruits white at maturity. The shrub is a handsome one when covered with its abundant, white flowers.

Miconia globuliflora (Rich.) Cham. Common in humid forests of the central mountains, mostly at 1,400–2,400 meters, ascending high on the slopes of Poás; region of San Ramón, at 1,000 meters or more. Ranging to West Indies and the Guianas. A shrub or small tree, 2–6 meters high, glabrous throughout or nearly so, the branches tetragonous; leaves petiolate, rather thick, ovate-oblong, mostly 6–10 cm. long, acuminate, rounded or obtuse at the base, 5-nerved, serrulate or entire; panicles thyrsiform, usually 4–6 cm. long, the flowers pedicellate; calyx 1.5 mm. long, distinctly lobate; petals white, 1.5 mm. long; fruit dark blue, 3 mm. in diameter.

Miconia gracilis Triana. Frequent in forests of the tierra caliente, ascending to middle elevations (Alto del Palmital) on the Pacific slope. Nicaragua and Panama. A slender shrub, glabrous throughout, the branches terete; leaves short-petiolate, membranaceous, yellow-green when dried, oblong to lance-oblong or oblong-elliptic, 10–18 cm. long, caudate-acuminate, attenuate at the base, entire, 3-nerved or obscurely 5-nerved; panicles very narrow, raceme-like, sessile or short-pedunculate, few-flowered, 4–10 cm. long, the flowers short-pedicellate; calyx 2 mm. long, the limb obscurely lobate; petals minute, bilobate; fruit globose, 4 mm. in diameter.

Miconia guianensis (Aubl.) Cogn. Collected in Costa Rica by Oersted, the locality not indicated; determination by Cogniaux. Extending to West Indies and Brazil. A large shrub or small tree, the young branches densely furfuraceous-puberulent; leaves rather large, petiolate, subcoriaceous, oblong to ovate, long-acuminate, rounded at the base, 5–7-nerved, entire or nearly so, glabrous above, densely stellate-furfuraceous and pale beneath; panicles 10–20 cm.

long, rather dense, the pedicels 2–5 mm. long, the flowers mostly 6-parted, the bracts conspicuous, 6–8 mm. long, caducous, grayish; calyx 5–6 mm. long, glabrous or nearly so; petals white, 6–8 mm. long; fruit subglobose, 6 mm. in diameter. This species is close to *M. dodecandra*, to which the Costa Rica collection may be more properly referable. In that species the calyx is densely grayish-tomentose.

Miconia habrolepis Standl. Reported from the region of El General. Ranging to Guatemala and British Honduras. A tree 9–12 meters high, the young branches compressed, densely and minutely ferruginous-lepidote; leaves short-petiolate, coriaceous, elliptic-oblong, 12–25 cm. long, caudate-cuspidate, acute to almost rounded at the base, 3-nerved, glabrous and lustrous above, very densely ferruginous-lepidote beneath; panicles pyramidal, 10–20 cm. long, the flowers usually secund; calyx campanulate, 2 mm. long, densely lepidote, truncate or obscurely denticulate; petals white; fruit 4 mm. in diameter.

Miconia hemenostigma Naud. Reported from La Ardilla, Pacific slope, *Tonduz 7740*. Mexico. Branches obtusely tetragonous, the young branches, petioles, and panicles rather sparsely furfuraceous-puberulent; leaves petiolate, oblong or ovate-oblong, 15–20 cm. long, acuminate, rounded at the base, 5-nerved, glabrous above, furfuraceous beneath, especially on the nerves; panicles pyramidal, 8–12 cm. long, the flowers pedicellate; calyx sparsely furfuraceous, obscurely dentate, 2 mm. long; petals white, retuse, 1.5 mm. long.

Miconia holosericea (L.) Triana. Diquís, *Pittier 12026*. Extending to Brazil. A shrub; leaves petiolate, ovate, large, coriaceous, long-acuminate, rounded at the base, 5-nerved or somewhat 5-plinerved, glabrous above, pale or brownish beneath and covered with a very dense, appressed, minute tomentum; panicles rather dense, 4–8 cm. long, the flowers sessile, 6-parted; calyx tube 6 mm. long, stellate-tomentose, the lobes 3–4 mm. long, reflexed; petals white, 7–9 mm. long; fruit globose-ovoid, 6 mm. long.

Miconia hondurensis Donn. Smith. Between Puerto Jiménez and Río Nuevo, Pacific coast, collected only by Brenes. Honduras and British Honduras. A shrub or small tree, glabrous almost throughout, the branches obtusely tetragonous or terete; leaves short-petiolate, more or less coriaceous, oblong or elliptic-oblong, mostly 15–18 cm. long, abruptly acuminate, acute or obtuse at the base, 3-plinerved, entire; panicles large and many-flowered, rather

lax, the flowers 5-parted, sessile or nearly so; calyx sparsely pulverulent, 3.5 mm. long, 10-costate; petals white or yellowish, retuse, 4 mm. long.

Miconia hyperprasina Naud. Forests of the tierra caliente. Panama to Mexico. A slender shrub, the young branches, petioles, panicles, and calyx minutely furfuraceous; leaves short-petiolate, thin, broadly oblong-lanceolate or elliptic-oblong, 15–30 cm. long, short-acuminate, acute at the base, 3–5-nerved, repand-crenate or almost entire, glabrous or sparsely furfuraceous-puberulent; panicles pyramidal, lax, many-flowered, the flowers short-pedicellate; calyx 3 mm. long, the lobes distinct, triangular; petals white, retuse, 2 mm. long.

Miconia ibaguensis (Bonpl.) Triana. Frequent in the Pacific tierra caliente, ascending to 1,200 meters; Aguacaliente; region of San Ramón. Mexico to Brazil and Peru. Usually a shrub of 2 meters or less, the branches, petioles, and panicle branches densely stellate-velutinous and long-setulose; leaves short-petiolate, sometimes subsessile, oblong or oblong-lanceolate, mostly 8–12 cm. long, long-acuminate, rounded or obtuse at the base, minutely serrulate and ciliate, 5-plinerved, short-setulose above, setulose-hirtellous beneath; panicles pyramidal, mostly 10 cm. long or less, many-flowered, the flowers sessile, congested; calyx 3 mm. long, stellate-villous and setulose, the limb distinctly 5-lobate; petals white, yellowish, or pink, 2.5–3 mm. long; fruit 3 mm. in diameter. Var. *glabrata* Cogn., reported from the Pacific coast, is a form with less abundantly pubescent or glabrate leaves.

Miconia impetiolaris (Swartz) D. Don. *Hoja de pasmo.* Frequent in thickets and forest of the tierra caliente. Mexico to West Indies and Bolivia. A shrub or small tree, 2–5 meters high, the branches densely tomentose-hirtellous; leaves sessile, thin, oblong to obovate, mostly 20–50 cm. long, abruptly short-acuminate, cordate and clasping at the base, auriculate, entire or nearly so, 5-plinerved, glabrous above or nearly so, densely stellate-hirtellous beneath; inflorescence paniculate, 10–25 cm. long, the flowers sessile and glomerate along the spikelike branches; calyx stellate-furfuraceous, 2.5–3 mm. long, obscurely 5-lobate; petals white, retuse, 2 mm. long; fruit blue, 4 mm. in diameter.

Miconia lacera (Bonpl.) Naud. Reported from Buenos Aires, Pacific tierra caliente; also Llanuras de Santa Clara; probably common in the Atlantic tierra caliente. Mexico to West Indies and

Brazil. A shrub of 1–2 meters, the branches sparsely long-hirsute; leaves short-petiolate, oblong to oblong-ovate, 7–15 cm. long, long-acuminate, obtuse at the base, denticulate, 3–5-nerved, sparsely setose above, villous-hirtellous beneath; panicles narrow, 10 cm. long or less, long-hirsute, the flowers sessile, secund along the branches; calyx tube 2 mm. long, glabrous, the inner lobes almost equaling the tube, setose-laciniate; petals pink, 3–4 mm. long; fruit 3–3.5 mm. in diameter. The abundant, stiff hairs of the branches are reddish and often 1 cm. or more in length.

Miconia laevigata (L.) DC. Forest or thickets of the central mountains, at middle or rather high elevations. Mexico to West Indies and the Guianas. A rather slender shrub, the young branches, petioles, panicles, and calyces punctate- or stellate-furfuraceous; leaves short-petiolate, oblong or ovate-oblong, 10–18 cm. long, long-acuminate, rounded at the base or obtuse, 5-nerved, glabrous above in age, granular-furfuraceous beneath on the nerves or finally glabrous; panicles pyramidal, 5–10 cm. long, the flowers mostly sessile and congested; calyx 3–3.5 mm. long, the teeth acute, remote; petals white, 3–4 mm. long; fruit blue or almost black, obscurely 10-costate, 3 mm. in diameter.

Miconia lamprophylla Triana. Río Naranjo, Pacific slope, and Talamanca, Atlantic slope, both in the tierra caliente. Colombia. A shrub or small tree, glabrous almost throughout, the branches obscurely tetragonous; leaves large, subcoriaceous, very lustrous, short-petiolate, oblong or oblong-lanceolate, 20–35 cm. long, short-acuminate, acute and asymmetric at the base, 3-nerved or obscurely 5-nerved; panicles trifid, the branches elongate, slender, furfuraceous; calyx urceolate, 2 mm. long, sparsely furfuraceous; petals minute, subtriangular. Mr. C. V. Morton reports that the Talamanca specimen is in poor condition, and that its determination was questioned by Cogniaux.

Miconia lauriformis Naud. Frequent in forests of the region of Dota, at middle elevations, Pacific slope, usually growing in rather open, oak forest; also El Abejonal and Los Frailes, Candelaria. Extending to Mexico. A slender shrub or tree, sometimes 6 meters high, glabrous throughout or nearly so, the branches terete; leaves ovate-oblong, slender-petiolate, firm, 4–10 cm. long, acute or acuminate, rounded to acute at the base, 3–5-plinerved, entire, puberulent beneath near the bases of the nerves, elsewhere glabrous; panicles rather few-flowered, 4–7 cm. long, the flowers pedicellate; calyx

glabrous, 3 mm. long, the lobes very short, obtuse; petals white or pink, 5–6 mm. long.

Miconia leucantha Gleason, Bull. Torrey Club 63: 534. 1936. Vicinity of El General, Prov. San José, 1,010 meters, *Skutch 2500*. Known only from the original collection. A tree of 18 meters, the branchlets minutely cinereous-furfuraceous at first; leaves slender-petiolate, ovate-elliptic, as much as 15 cm. long and 8 cm. wide, acute and caudate at the apex, the acumination 2 cm. long and 2 mm. wide, obtuse or rounded at the base, 5-nerved, glabrous; panicles broadly pyramidal, 8 cm. long, the flowers 5-parted; calyx tube campanulate, 3 mm. long, stellate-furfuraceous, the lobes 1 mm. long; petals furfuraceous outside, reddish, 6 mm. long.

Miconia Lindenii Naud. This species was reported from Costa Rica by Cogniaux upon the basis of an Oersted collection. The species is too closely related to *M. aeruginosa*, and doubtfully distinct. I suspect that the Costa Rican material, at least, should be referred directly to *M. aeruginosa*.

Miconia lonchophylla Naud. Forests and thickets of the Atlantic tierra caliente; region of San Ramón; San Marcos; El Abejonal; at 1,100 meters or less. Extending to Venezuela. A slender shrub of 2–3 meters, the branches obscurely tetragonous, the young branches, petioles, panicles, and calyces as well as the lower leaf surface sparsely and minutely stellate-furfuraceous; leaves broadly lanceolate or lance-oblong, mostly 10–15 cm. long, acuminate, acute at the base, entire, 5-plinerved or 3-plinerved, glabrous above or nearly so; panicles broadly pyramidal, 5–10 cm. long, many-flowered, the flowers mostly sessile and glomerate; calyx broadly campanulate, 2–2.5 mm. long, subtruncate; petals white, retuse, 2–2.5 mm. long; berries bluish black, 3 mm. in diameter.

Miconia longifolia (Aubl.) DC. has been reported from Costa Rica, and numerous collections have been referred to it. All such specimens that I have seen have been referable to other species, and while *M. longifolia* may well grow here, its occurrence is somewhat doubtful.

Miconia macrophylla (D. Don) Triana. Reported from Diquís, Pacific tierra caliente. Mexico to West Indies, Brazil, and Peru. A shrub or small tree, the young branches compressed, densely but minutely brown-tomentulose; leaves petiolate, ovate to ovate-oblong, mostly 15–30 cm. long, acuminate, rounded or emarginate to obtuse at the base, 5–9-nerved, at first puberulent above but soon

glabrate, densely but very minutely ferruginous-stellate-tomentulose beneath; panicles narrow, 10–30 cm. long, the flowers 6-parted, sessile; calyx oblong, constricted below the limb, 7 mm. long, densely and minutely tomentulose, truncate or obscurely denticulate; petals white or pink, 6–8 mm. long; fruit globose, 6 mm. in diameter. The Costa Rican collection was referred to var. *latifolia* (DC.) Cogn.

Miconia Matthaei Naud. *Canillito.* Forests and thickets of the tierra caliente; Cañas Gordas, on the Pacific slope. British Honduras to Trinidad and Brazil. A tree of 12 meters or less, the branches, petioles, branches of the inflorescence, and calyces densely hirsute with long, rusty hairs; leaves short-petiolate, lanceolate or lance-oblong, 12–20 cm. long, acuminate, acute at the base, 3-nerved, glabrous and lustrous above, often somewhat bullate, short-hirtellous beneath; panicles large and many-flowered, the flowers 5-parted, sessile and glomerate; calyx distinctly 5-lobate; petals white, 8 mm. long; fruit black, 3 mm. in diameter. Well marked by the long and narrow, 3-nerved leaves and the abundant pubescence of very long, soft hairs.

Miconia microcarpa DC. Reported from the tierra caliente (plains of Santa Clara; Buenos Aires) and at middle elevations on the Pacific slope (Cañas Gordas). Extending to Amazonian Brazil. Branches obtusely tetragonous, the young branches, petioles, panicles, and calyces finely stellate-velutinous; leaves short-petiolate, oblong or oblong-lanceolate, 10–15 cm. long, long-acuminate, rounded at the base, 5-nerved, glabrous above, at least in age, stellate-punctate beneath; panicles broadly pyramidal, reddish, 5–10 cm. long; calyx 2 mm. long, the lobes rounded; petals white; fruit dark purple, 10-sulcate, 3–3.5 mm. in diameter.

Miconia multiplinervia Cogn. *M. Alfredi* Kraenzl. Vierteljahr. Naturf. Gesell. Zürich 76: 155. 1931 (Alto de La Palma, 1,540 meters, *Tonduz 12499*). La Palma and La Hondura de San José, in forest at 1,300–1,550 meters; region of San Ramón, 850–1,300 meters. Colombia. A shrub of 1–3.5 meters, the branches densely stellate-tomentose; leaves ovate or broadly ovate, mostly 8–14 cm. long, rather abruptly acuminate, almost rounded to subacute at the base, 7–9-plinerved, very rough above and hispidulous-hirtellous from the apices of coarse papillae, stellate-tomentose and foveolate beneath; panicles broadly pyramidal, 20 cm. long or less, the flowers sessile in dense heads at the ends of the branchlets; calyx shallowly lobate, 3 mm. long; petals white. Conspicuous for the curious

papillosity of the upper leaf surface, and noteworthy also for the 7–9-plinerved leaves.

Miconia myrtillifolia Naud. *Topobea micrantha* Pittier. Region of San Ramón, 1,850 meters; Cascajal, 1,500–2,100 meters; El Tenorio. Extending to Panama and Venezuela. A slender, densely branched shrub or small tree, glabrous almost throughout; branches tetragonous; leaves small, short-petiolate, subcoriaceous, ovate to broadly elliptic or almost rounded, 2–3 cm. long, acute, subacute at the base, more or less serrulate, 3-nerved; panicles corymbiform, few-flowered, 2–4 cm. long, the bractlets green, lance-linear, as much as 1 cm. long; calyx 4–5 mm. long, campanulate, the lobes triangular, acute; petals white, obovate, 3 mm. long; fruit 4 mm. in diameter. A well marked and isolated species, noteworthy for the small leaves and the small inflorescences with conspicuous, foliaceous bractlets.

Miconia nervosa (Smith) Triana. Frequent in forest and thickets of the tierra caliente, at 650 meters or less. Southern Mexico to Bolivia and Brazil. A shrub of 1–2.5 meters, the branches, petioles, panicles, and calyces densely appressed-setulose with fulvous or brownish hairs; leaves very short-petiolate or subsessile, ovate-lanceolate or lanceolate, 15–30 cm. long, long-acuminate, long-attenuate to the base, 7-plinerved, setulose and scabrous on the upper surface, setulose beneath with appressed or spreading hairs; panicles narrow and spikelike or raceme-like, 5–15 cm. long, the flowers sessile and densely congested; calyx 4 mm. long; petals white or pink, 3.5–4 mm. long; fruit 10-costate, 4–5 mm. in diameter.

Miconia nutans Donn. Smith, Bot. Gaz. 42: 296. 1906. Río Coto de Osa, Prov. Puntarenas, 1,100 meters, *Pittier 11059*. Cañas Gordas; region of San Ramón; El General. Guatemala. Branches obtusely tetragonous, the young branches, petioles, and inflorescence minutely and closely lepidote-furfuraceous; leaves short-petiolate, obovate-oblong, 15–25 cm. long, acuminate, acute at the base, coriaceous, 5-plinerved, entire or nearly so, glabrous or somewhat furfuraceous beneath on the nerves; panicles pyramidal, the flowers 5-parted, sessile or short-pedicellate; calyx minutely pale-furfuraceous, 3.5 mm. long, lobate; petals 4 mm. long, linear-oblong; fruit 4.5 mm. in diameter, 10-costate.

Miconia paleacea Cogn. in DC. Monogr. Phan. 7: 757. 1891. Near Desengaño and Cariblanco, *Wendland;* Talamanca; Río Naranjo. Also in Colombia. Young branches, petioles, and panicles

densely crinite with a retrorse, paleaceous indument; leaves large, long-petiolate, ovate to rounded, 40–50 cm. long, short-acuminate, rounded at the base, almost entire, 5-nerved, at first densely short-furfuraceous-puberulent on both sides, soon glabrate; panicles pyramidal, compact, 5–15 cm. long, the flowers sessile, glomerate; calyx 4 mm. long, densely short-hirtellous, obscurely lobate; petals pinkish white, glabrous, 4 mm. long; fruit subglobose, 4 mm. in diameter.

Miconia pedicellata Cogn. in DC. Monogr. Phan. 7: 875. 1891. *Canilla de mula.* Based in part upon a collection from Rancho Flores, 2,030 meters, *Tonduz.* Upper slopes of Poás and mountain forests of the region of Dota, ascending to 2,100 meters or more. Peru. A shrub of 2–3 meters, glabrous throughout or nearly so, the branches subterete; leaves short-petiolate, subcoriaceous, narrowly lanceolate or lance-oblong, 8–12 cm. long, long-acuminate, acute at the base, 5-plinerved, entire; panicles rather small and few-flowered, 2–3 cm. long, the flowers mostly on rather long pedicels; calyx distinctly 5-lobate, 2.5 mm. long; petals ovate, 3 mm. long, white.

Miconia Pittieri Cogn. in DC. Monogr. Phan. 7: 1191. 1891. Río Mancaro, 2,100 meters, *Pittier 2005.* Branches obscurely tetragonous, the young branches, petioles, and inflorescence shortly and densely hirtellous; leaves long-petiolate, broadly ovate, 7–11 cm. long, short-acuminate, rounded and often emarginate at the base, 7-nerved, scarcely denticulate, densely short-hirtellous on both surfaces; panicles broadly pyramidal, many-flowered, 10–15 cm. long, the flowers densely glomerate, the pedicels 1–2 mm. long; calyx 2 mm. long, the lobes short, obtuse; petals rounded, 1.5 mm. long. Of this species I have seen only a photograph of type material.

Miconia prasina (Swartz) DC. Reported from Cartago and Atirro, 600–1,400 meters, the determinations questionable. Mexico and West Indies to Paraguay. A shrub 5 meters high or less, the branches compressed at the apex, the young ones puberulent; leaves short-petiolate, oblong or lanceolate, sometimes oblanceolate-oblong, 10–20 cm. long, acuminate, acute at the base, membranaceous, entire or nearly so, puberulent beneath at first; panicles pyramidal, 5–15 cm. long, many-flowered; calyx 2.5–3.5 mm. long; petals white, 2–3 mm. long; fruit dark purple, 10-costate, 4 mm. in diameter.

Miconia pteropoda Benth. Forest and thickets of the tierra caliente; also frequent at middle elevations; region of San Ramón; El General; Cocos Island. Extending to Brazil. A shrub or small tree, the young branches, petioles, and inflorescence closely stellate-

puberulent; leaves on very short petioles, the petioles winged to the base, the blades firm, ovate-oblong or oblong-lanceolate, 15–20 cm. long, long-acuminate, acute at the base, 5-plinerved, undulate-dentate, glabrous above or nearly so, punctate-furfuraceous beneath, at least on the nerves, paler beneath; inflorescence pyramidal, 15–20 cm. long, the flowers sessile or nearly so, glomerate; calyx 3 mm. long; petals white, minutely puberulent or glabrous outside, 3 mm. long; fruit 10-sulcate, 4 mm. in diameter.

Miconia punctata (Desr.) D. Don. Reported from the region of Tuis, *Tonduz 8120*. Cuba and Jamaica; Venezuela to Bolivia. A shrub or small tree, the branches tetragonous, densely and minutely brown-lepidote; leaves petiolate, coriaceous, lanceolate or oblong, 10–18 cm. long, acuminate, acute or attenuate at the base, glabrous above, the veins impressed, densely appressed-brown-lepidote beneath; panicles pyramidal, much branched, 10–15 cm. long; calyx 2 mm. long, subtruncate, densely lepidote; petals 2 mm. long; fruit globose, 3 mm. in diameter. The Costa Rican collection was determined by Cogniaux as var. *latifolia* Cogn.

Miconia reducens Triana. Reported from the region of El General. Colombia. A tree, reported to reach a maximum height of 20 meters, glabrous throughout, the branches acutely tetragonous; leaves short-petiolate, coriaceous, oblong, 15–25 cm. long, lustrous, short-acuminate or rounded and apiculate at the apex, abruptly contracted and attenuate at the base, 5-plinerved; panicles pyramidal, 10–15 cm. long, the flowers sessile, the buds cernuous; calyx 4 mm. long, the limb shallowly 4–5-dentate; flowers fragrant, the petals pink, linear-oblong, 7–8 mm. long; fruit globose, 5 mm. in diameter.

Miconia rubens (Swartz) Naud. Reported from various localities in central mountains at middle or rather high elevations. Jamaica and Venezuela. A shrub, glabrous throughout, the branches obtusely tetragonous; leaves short-petiolate, oblong, 6–9 cm. long, submembranaceous, acuminate, obtuse or subacute at the base, obscurely denticulate; panicles pyramidal, 4–7 cm. long, the flowers short-pedicellate; calyx about 2 mm. long, hemispheric; petals white, less than 1 mm. long; fruit 2 mm. in diameter.

Miconia rubiginosa (Bonpl.) DC. Buenos Aires, Pacific tierra caliente, 250 meters. Ranging to Puerto Rico, Brazil, and Bolivia. A shrub or small tree, the branches, petioles, panicles, and lower leaf surface densely ferruginous-tomentose with a close tomentum;

leaves ovate or ovate-oblong, 6–10 cm. long, short-acuminate, rounded or subcordate at the base, coriaceous, entire, 3–5-nerved, lustrous above and glabrate, but very rough to the touch; panicles dense, pyramidal, 5–15 cm. long, the flowers sessile and densely glomerate, 5-parted; calyx densely pilosulous, 2.5–3 mm. long, obscurely lobate; petals white, 2 mm. long; fruit black, 3–4 mm. in diameter.

Miconia sancti-ramoni Kraenzl. Vierteljahr. Naturf. Gesell. Zürich 76: 157. 1931. Between San Ramón and San Pedro, 1,300 meters, *Tonduz 17843*. A shrub 1.5–2 meters high, the branches obscurely tetragonous, brown-pilose and setose; leaves on very short petioles, oblong-lanceolate, 16 cm. long or less, rigid, long-acuminate, 3–5-nerved, sparsely setose above, more densely setose beneath, especially on the nerves; panicles 10 cm. long or less, the branches subscorpioid, brown-villous, the flowers sessile or nearly so; calyx 3 mm. long, the 5 teeth very short; petals white. This species should be represented in the ample collections available from San Ramón, but none of those observed seem to agree well with the original description.

Miconia Schlimii Triana. Forest and thickets of the tierra caliente; El General; region of San José; at 1,600 meters or less. Guatemala to Colombia. A shrub or small tree, sometimes 9 meters high, the branches, petioles, panicles, and calyces densely furfuraceous-puberulent; leaves oblong-lanceolate or oblong-ovate, long-acuminate, acute or obtuse at the base, 5-plinerved, sinuate-dentate, glabrous above, sparsely furfuraceous or almost glabrous beneath, 8–16 cm. long; flowers pedicellate, in few-flowered cymes 3–4 cm. long; calyx 6 mm. long, obscurely lobate; petals white, 6–7 mm. long.

Miconia scorpioides (Schlecht. & Cham.) Naud. Naranjo; reported from El General and Diquís. Mexico to Brazil and Peru. A shrub or small tree, the young branches compressed, closely lepidote; leaves short-petiolate, subcoriaceous, oblong or obovate-oblong, 15–25 cm. long or sometimes smaller, short-acuminate, acute or attenuate at the base, entire, 3-nerved, glabrous above or nearly so, minutely and obscurely lepidote beneath; panicles long and narrow, the branches scorpioid, the flowers secund; calyx 2 mm. long, campanulate-hemispheric, obscurely 5-lobate; petals 2.5 mm. long; fruit obscurely 10-costate, 5 mm. in diameter.

Miconia serrulata (D. Don) Triana. Reported from El General, collected by Skutch. Ranging to Peru. Young branches,

petioles, and panicles sparsely furfuraceous; leaves short-petiolate, oblong, 6–11 cm. long, acute, rounded or obtuse at the base, 3-nerved, glabrous, serrulate; panicles pyramidal, 5–10 cm. long, the flowers pedicellate; calyx subhemispheric, 1.5 mm. long, the very short lobes obtuse; petals retuse, less than 1 mm. long.

Miconia stenostachya DC. Region of Buenos Aires, Pacific tierra caliente, 250–500 meters. Mexico to Bolivia and Brazil. A shrub 1–2 meters high, the branches, petioles, and panicles densely and minutely pale-tomentulose; leaves short-petiolate, oblong or ovate-oblong, 10–15 cm. long, obtuse or acute, obtuse at the base, 5-nerved, entire, glabrous above, densely and closely white-tomentulose beneath; panicles long and narrow, 5–15 cm. long, the branches scorpioid, the flowers sessile, secund; calyx 3.5–4 mm. long; petals white or pink, 3–3.5 mm. long; fruit black, 10-costate, 5 mm. in diameter. Called Dos caras in Panama.

Miconia sylvestris Gleason, Brittonia 2: 321. 1937. Region of El General, Prov. San José, 1,070 meters, *Skutch 2799*. A shrub 2.5 meters high, the young branches minutely pilosulous with simple hairs, soon glabrate; leaves petiolate, membranaceous, narrowly elliptic-oblong, 18 cm. long or less, acuminate at each end, entire, 5-plinerved, at first minutely pilosulous on both surfaces but soon glabrate; panicles 4 cm. long, the branches minutely hirtellous, the flowers 4-parted, sessile; calyx 1.6 mm. long, minutely pilosulous, 8-costate; petals almost 2 mm. long, subacute.

Miconia Tonduzii Cogn. in DC. Monogr. Phan. 7: 1191. 1891. Frequent in forests of both slopes at middle or rather high elevations, chiefly at 1,100–2,500 meters; regions of San Ramón and Dota. Endemic. A shrub or small tree, almost glabrous or often conspicuously furfuraceous-puberulent on the young branches, petioles, panicles, and lower leaf surface; leaves short-petiolate, firm-membranaceous, oblong to ovate-oblong, mostly 9–15 cm. long, acuminate, subacute or obtuse at the base, 3-plinerved or obscurely 5-plinerved, remotely denticulate or subentire; panicles pyramidal, 10–15 cm. long, the flowers mostly pedicellate; petals white, suborbicular, 2 mm. long. The species was described with six varieties: *latifolia* (Rancho Flores, Volcán de Barba, *Tonduz*), *furfuracea* (Rancho Flores, *Tonduz*), *oblongifolia* (Rancho Flores, *Tonduz*), *cuneata* (Rancho Flores, *Tonduz*), *serrulata* (Río Poás, *Pittier*), and *parvifolia* (Rancho Flores, *Tonduz*). The species is a highly variable one, if all the material referred to it represents a single specific

unit, but it seems impractical to distinguish the varieties, which were based upon apparently unimportant characters.

MONOCHAETUM Naud.

Reference: Gleason, The genus *Monochaetum* in North America. Amer. Journ. Bot. 16: 586. 1929.

Plants low and branched, herbaceous or suffrutescent, usually densely pubescent; leaves small, ovate or lanceolate, mostly entire, 3–7-nerved, the nerves impressed on the upper surface; flowers rather small, chiefly terminal and cymose, rarely solitary, mostly pink or purple, 4-parted; calyx tube setose or pilose, oblong-campanulate or tubular, the lobes ovate or lanceolate, acute, equaling or shorter than the tube; petals obovate; stamens 8, biseriate, alternately unequal, the filaments glabrous; anthers dissimilar, elongate-linear or subulate, inflexed, 1-pored, the larger ones subulate, the connective not produced below the cells, posteriorly produced into a short or elongate tail; ovary 4-celled; capsule 4-valvate; seeds arcuate or cochleate.—A few other species grow in Central America.

Monochaetum intermedium Gleason, Amer. Journ. Bot. 16: 589. 1929. Las Cóncavas, near Cartago, 1,140–1,260 meters, *G. Proctor Cooper 38*. Known only from the original locality. Stems densely strigose, the hairs all appressed; leaves short-petiolate, oblong-lanceolate, 2.5 cm. long or less, acute, cuneate at the base, 5-plinerved; calyx tube 4 mm. long, glandular-pubescent, the sepals 3.7 mm. long. Readily distinguished from the related *M. rivulare* by the appressed hairs of the stems.

Monochaetum macrantherum Gleason, Amer. Journ. Bot. 16: 591. 1929. Between Vara Blanca and Concordia, 1,600–1,950 meters, *Maxon & Hay 8424*. Also in Nicaragua and Panama. Stems strigose, the nodes hirsute; leaves oblong or oblong-lanceolate, about 2 cm. long, acute, broadly cuneate at the base, 5-plinerved, sparsely strigose on the upper surface, glabrous or minutely pilose beneath; calyx tube campanulate or obconic, 5–6 mm. long, sparsely strigose with barbellate hairs, the sepals 4.5–5.5 mm. long.

Monochaetum rivulare Naud. Common in forest or on shaded banks at middle and upper elevations, also in the Atlantic tierra caliente; region of San Ramón, chiefly at 1,100–2,700 meters. Extending to Mexico. Plants erect, mostly 40–60 cm. high, often densely branched, the branches densely villous; leaves almost

sessile, oblong, subacute, 2–3 cm. long, strigose between the nerves, especially beneath, 3-plinerved; cymes many-flowered; calyx tube hirtellous, 5 mm. long, the lobes 3–5 mm. long; petals usually pink. In the typical form the pubescence of the inflorescence is eglandular. In *M. rivulare* f. *glandulosum* Gleason (Amer. Journ. Bot. 16: 590. 1929; Cartago, *Tonduz 10438*) the pubescence of the inflorescence includes many gland-tipped hairs. Costa Rican material of this species has been referred to *M. Hartwegianum* Naud.

Monochaetum vulcanicum Cogn. in DC. Monogr. Phan. 7: 401. 1891. *M. Carazoi* Cogn. loc. cit. (slopes of Volcán Poás, 1,900 meters, *Pittier*). Summit of Volcán Poás, 2,600 meters, *Pittier*. Upper slopes of the central volcanoes, mostly at 1,800–2,700 meters, in forest or on open banks; Palmira del Naranjo. Endemic. A densely branched shrub, a meter high or less, the stout branches setose, densely leafy; leaves elliptic-ovate, mostly 1–2 cm. long, obtuse, more or less strigillose on both surfaces, ciliate, 3-plinerved; flowers in small cymes or rarely solitary, purple-pink; calyx tube 6 mm. long, short-setulose, the lobes of equal or greater length. Gleason (Amer. Journ. Bot. 16: 591. 1929) recognized three forms of the species, f. *typicum*, f. *costaricense*, and f. *glandulosum*, based upon variations in leaves and pubescence. The best marked is f. *glandulosum*, with gland-tipped hairs on the pedicels and calyx.

MOURIRIA Aubl.

Glabrous shrubs or trees; leaves sessile or nearly so, entire, 1-nerved or penninerved; flowers small, fasciculate or solitary in the leaf axils, commonly 5-parted; calyx limb cupular, lobate or subtruncate; petals acute or acuminate; stamens twice as many as the petals, equal; fruit baccate, 1–4-seeded.—At least two other species occur in Central America. The genus differs from all others of Central America in having 1-nerved or penninerved leaves, and the plants in general appearance are most unlike other groups of the family.

Mouriria parvifolia Benth. Reported by Cogniaux as collected in Costa Rica by Endres. Common along the Atlantic coast of Central America, and certainly to be expected in Costa Rica; extending to Colombia and Bolivia. A shrub or small tree; leaves ovate-lanceolate, 3–6 cm. long, acute, rounded or subcordate at the base; flowers short-pedicellate, the pedicels articulate and bibracteolate at the apex; fruit 8 mm. in diameter.

NEPSERA Naud.

Plants herbaceous or suffrutescent; leaves thin, ovate, petiolate; flowers small, white or pink, paniculate, 4-parted; calyx tube ovoid, the lobes narrowly lanceolate, persistent; petals oblong-lanceolate, acute; stamens 8, alternately unequal, the filaments glabrous, the anthers subulate, 1-porose, the connective produced below into 2 spurs; ovary 3-celled; capsule 3-valvate, the numerous seeds minute, foveolate.—A single species is found in Central America.

Nepsera aquatica (Aubl.) Naud. Collected near El Cairo in the Atlantic tierra caliente, and probably frequent along the Atlantic coast. Central America to West Indies and northern South America. Plants much branched, a meter high or less, laxly pilose or glabrate; leaves 2–7 cm. long, serrulate, 5–7-nerved, acute or acuminate, rounded or subcordate at the base; pedicels filiform; calyx tube 2–3 mm. long; petals 5–6 mm. long; capsule globose, 2 mm. in diameter.

OSSAEA DC.

Shrubs, variously pubescent or glabrous; leaves mostly membranaceous, 3–7-nerved or 3–7-plinerved, entire or denticulate; flowers small or minute, in axillary cymes or panicles, 4–5-parted; calyx tube oblong or campanulate, the limb truncate or dentate, the outer teeth usually produced and subulate; petals acuminate; stamens twice as many as the petals, equal, the filaments filiform, glabrous, the anthers linear to oblong or subulate, minutely 1-pored at the apex, the connective not or obscurely produced below the cells, not or obscurely appendaged; ovary 3–5-celled; fruit globose, 3–5-celled, baccate, often conspicuously ribbed; seeds angulate, pyramidal, or obovoid, usually smooth.—A few other species are known from Central America.

Ossaea boliviensis (Cogn.) Gleason (*Clidemia boliviensis* Cogn.) has been reported from Boruca (*Tonduz 3779*), but the species is a South American one, and its occurrence in Costa Rica doubtful. I have not seen the collection on which the report is based.

Ossaea bracteata Triana. Cocos Island. Colombia. A shrub 2.5–3 meters high, the young branches and inflorescence sparsely furfuraceous; leaves long-petiolate, oblong-elliptic, mostly 15–30 cm. long, short-acuminate, acute at the base, 5-nerved or 5-plinerved, glabrous; panicles short, the branches stout, the flowers surrounded by conspicuous, imbricate bracts; calyx densely furfuraceous, 3 mm. long; petals white.

Ossaea Brenesii Standl., sp. nov.—Section *Octopleura*. Frutex, ramis crassis densissime tomento ochraceo adpresso furfuraceo tuberculato indutis; folia subaequalia breviter petiolata membranacea, petiolo crasso ut ramis induto usque 3.5 cm. longo sed vulgo multo breviore; lamina elliptica vel ovato-elliptica 13–24 cm. longa 8–12 cm. lata breviter acuminata, basi acuta, undulato-crenulata, 7-plinervia, nervis interioribus bene supra basin nascentibus, supra in statu juvenili dense tuberculoso-furfuracea, cito glabrata, subtus ad nervos venasque densissime tuberculoso-furfuracea, aliter glabra vel glabrata; paniculae axillares usque 6 cm. longae breviter pedunculatae ubique densissime ochraceo-tuberculoso-furfuraceae, laxe multiflorae, ramis crassis divaricatis vel adscendentibus, floribus sessilibus, bracteis parvis deciduis; hypanthium dense furfuraceum 3 mm. longum costatum, dentibus exterioribus triangularibus acutiusculis 1.5 mm. longis; petala angusta attenuata 4 mm. longa extus furfuracea; fructus (immaturus?) globosus 3 mm. diam. grosse 10-costatus dense minute tuberculoso-furfuraceus.—Los Angeles de San Ramón (camino de la Finca Johanson), May, 1928, *Brenes 6160* (type in Herb. Field Mus.). Los Angeles de San Ramón (Finca Johanson), *Brenes 6125*. El Silencio (Los Angeles) de San Ramón, *Brenes 17108*.

Ossaea diversifolia (Bonpl.) Cogn. Frequent in thickets and forest, Atlantic tierra caliente, at less than 600 meters. Ranging to Colombia. A slender shrub, rarely more than 1.5 meters high, the branches, petioles, and inflorescence densely furfuraceous; leaves long-petiolate, ovate to rounded, mostly 15–20 cm. long, apiculate or short-acuminate, abruptly contracted and decurrent at the base, 5–7-plinerved, glabrous above, sparsely furfuraceous beneath; panicles small, usually shorter than the petioles, the flowers 5-parted, sessile or short-pedicellate; calyx furfuraceous, 3 mm. long; petals white; fruit dark blue, juicy, 4 mm. in diameter.

Ossaea macrophylla (Benth.) Cogn. in DC. Monogr. Phan. 7: 1064. 1891. *Oxymeris macrophylla* Benth. Bot. Voy. Sulph. 95. 1844. *Clidemia macrophylla* Naud. Ann. Sci. Nat. III. 17: 347. 1852. *C. solearis* Naud. loc. cit. *Octopleura macrophylla* Triana, Trans. Linn. Soc. 28: 145. 1871. Cocos Island, *Barclay*. Known only from Cocos Island; I have seen a photograph of the type. Branches, petioles, and inflorescence sparsely furfuraceous; leaves short-petiolate, oblong-obovate, 20–30 cm. long, obtuse and short-acuminate, subcuneate-obtuse at the base, 5-nerved, sinuate-denticulate,

glabrous; panicles 4–6 cm. long, lax; flowers 5-parted, the calyx truncate, 1.5 mm. long.

Ossaea micrantha (Swartz) Macfad. Frequent in forest and thickets of the Atlantic tierra caliente; region of San Ramón; at 1,300 meters or usually at lower elevations. Guatemala to West Indies and Peru. A slender shrub, usually 1–2 meters high, the branches, petioles, and inflorescence sparsely furfuraceous or glabrate; leaves slender-petiolate, oblong, lanceolate to oblong-elliptic, mostly 8–20 cm. long, acuminate, attenuate at the base, 5-plinerved, subentire, glabrous; flowers 4-parted, the panicles short, lax, little if at all exceeding the petioles, the flowers short-pedicellate; calyx 2 mm. long, minutely denticulate; petals white; fruit 4 mm. in diameter.

Ossaea quinquenervia (Mill.) Cogn. Reported from Cocos Island. Panama and Colombia. Branches, petioles, and inflorescence densely furfuraceous-puberulent; leaves narrowly ovate, 10–20 cm. long, short-acuminate, obtuse at the base, 5-nerved, subentire, sparsely pilosulous above, thinly furfuraceous beneath; panicles about equaling the petioles, the flowers 5-parted, long-pedicellate; calyx 2.5–3 mm. long; fruit globose, 5 mm. in diameter.

Ossaea tetragona Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 265. 1891. Camino de Carrillo, 300 meters, *Pittier 3148*. Apparently frequent in forests of the Atlantic tierra caliente. Endemic. Branches, petioles, and calyces furfuraceous; leaves ovate-oblong, 8–14 cm. long, short-acuminate, acutish at the base, 5-plinerved, subentire, glabrous; flowers 4-parted, slender-pedicellate, the calyx 1.5 mm. long, minutely denticulate; fruit 8-costate, 3 mm. in diameter.

Ossaea Valeriana Standl., sp. nov.—Frutex, ramulis gracillimis teretibus glabris vel glabratis, novellis sparse pilis longis patentibus setulosis, internodiis brevibus vel elongatis; folia modica graciliter longipetiolata membranacea, petiolo 1–4.5 cm. longo sparse longisetuloso; lamina ovata vel oblongo-elliptica 12–18 cm. longa 5–7.5 cm. lata subabrupte longe caudato-acuminata, basi obtusa 5-nervia, integra vel subundulata, supra in sicco laete viridis sparse breviter setulosa, subtus paullo pallidior glabra, ad marginem ciliata; paniculae multiflorae laxae saepius alares divaricato-ramosae petiolis paullo longiores, ramis gracilibus glabris vel hinc inde setulosis, bracteis minutis subulatis patentibus, floribus plerumque pedicellatis, pedicellis usque 5 mm. longis glabris, floribus centralibus vulgo

sessilibus; calyx ca. 2 mm. longus sparse longisetulosus, dentibus exterioribus minutis subulatis.—Forest between La Balsa and Cataratas de San Ramón, 850 meters, October, 1925, *Brenes 4525* (type in Herb. Field Mus.). Los Angeles de San Ramón, March, 1931, *Brenes 13635*. The species is named for Professor Juvenal Valerio Rodríguez, Director of the Museo Nacional de Costa Rica.

PTEROLEPIS Miq.

Small annuals, erect, sparsely branched, strigose or setose; leaves usually entire, small, 3–5-nerved, membranaceous, mostly oblong-lanceolate; flowers small, axillary or terminal, glomerate or solitary, sometimes paniculate, commonly 4-parted; calyx tube campanulate, beset with simple or penicillate hairs, the lobes rigid, narrowly triangular, persistent, alternating with stellate-penicillate setulae, equaling or shorter than the tube; petals obtuse, ciliate; stamens twice as many as the petals, alternately unequal, the filaments glabrous, the anthers mostly 1-pored, alike or dissimilar, the larger ones with the connective more or less produced below the cells, bituberculate or tumid anteriorly; ovary 4-celled, setose at the apex; fruit capsular; seeds cochleate, minutely tuberculate.—At least one other species occurs in Central America.

Pterolepis pumila (Bonpl.) Cogn. Frequent in moist, grassy places of the tierra caliente, often in savannas; regions of San Ramón and Santa María de Dota; ascending to 1,500 meters. Mexico to Peru. Plants mostly 15–30 cm. high, with few branches, the stems appressed-setose; leaves oblong-lanceolate, 1.5–2.5 cm. long, hirsute; flowers axillary and solitary or terminal and ternate; calyx tube ovoid-campanulate, 2–2.5 mm. long, the lobes 1.5–2 mm. long; petals rose-pink; anthers oblong or ovate-oblong; capsule 3 mm. long. An inconspicuous and weedy plant, often plentiful in grassland.

Pterolepis trichotoma (Rottb.) Cogn. Reported from Costa Rica by Cogniaux. Mexico to Peru. Similar to the preceding, from which it is not sharply differentiated; leaves rather sparsely pilose; flowers in ample, lax panicles; anthers linear-subulate, attenuate-rostellate.

RHYNCHANTHERA DC.

Plants usually herbaceous, often glandular-pilose or setose; leaves petiolate, ovate or oblong; flowers large and showy, 5-parted, paniculate, purple; calyx tube ovoid to campanulate, the lobes lanceolate to setaceous, usually as long as the tube; petals obovate;

stamens 10, very unequal, the 5 larger ones alternating with the petals, the anthers equal or one much larger than the others, usually terminated by an elongate beak, the connective long-produced below the cells; ovary commonly 3-celled; fruit capsular; seeds ovoid or oblong, straight or curved, foveolate.—No other species are known from Central America.

Rhynchanthera paludicola (Donn. Smith) Gleason, Phytologia 1: 136. 1935. *Tibouchina paludicola* Donn. Smith, Bot. Gaz. 42: 293. 1906. In swamps, Río Cañas Gordas, Puntarenas, 1,100 meters, *Pittier 11055*. El General. Panama. Plants erect, mostly 40–60 cm. high, suffrutescent or herbaceous, the stems glandular-hirtellous; leaves lance-oblong or oblong-ovate, 6–14 cm. long, acuminate, rounded at the base, 7–9-nerved; calyx tube 5 mm. long, sparsely glandular-hispidulous, the lobes glandular-ciliate, subulate, 5–9 mm. long; petals purple, 3 cm. long, acute and glandular-setaceous at the tip; capsule subglobose.

SCHWACKAEA Cogn.

Annual herbs, trichotomously branched; leaves small, membranaceous, entire, 3-nerved; flowers small, 4-parted, solitary or in small, leafy cymes; calyx glabrous, the tube narrowly oblong, 8-costate, the costae tuberculate-echinate, the lobes linear-subulate, pectinate-ciliate; petals obovate, eciliate, setulose-apiculate; stamens 8, alternately unequal, the filaments glabrous; anthers minute, ovoid, 1-pored, the connective in the larger anthers long-produced below the cells, bilobate anteriorly; ovary 4-celled, setulose at the apex; fruit capsular; seeds minute, cochleate, roughened.—The genus consists of a single species.

Schwackaea cupheoides (Seem.) Cogn. Frequent in moist places, often in savannas, Pacific slope, ascending to the Meseta Central, at 1,200 meters or less; region of San Ramón. Mexico to Panama. Plants erect, mostly 15–40 cm. high, rather sparsely branched, the stems red, setulose at the nodes, elsewhere glabrous or nearly so; leaves short-petiolate, ovate to oblong, 3–6 cm. long, acute, setulose or pilose, paler beneath; calyx tube 4–5 mm. long, the lobes erect, rigid, 3 mm. long; petals rose-pink, 6–7 mm. long; capsule 6–7 mm. long. An inconspicuous and weedy plant, frequent in many parts of Central America, at least on the Pacific slope.

TIBOUCHINA Aubl.

Trees, shrubs, or herbs; leaves membranaceous to coriaceous, petiolate, entire, 3–7-nerved; flowers typically 5-parted, small or large and showy, solitary or paniculate, sometimes subtended by large bracts, mostly pink or purple; calyx tube oblong to campanulate, the lobes subulate to ovate, equaling or exceeding the tube, persistent or deciduous; petals obovate, sometimes retuse; stamens twice as many as the petals, subequal or alternately unequal, the filaments glabrous, glandular, or pilose, the anthers alike, mostly linear-subulate, 1-pored, arcuate or sigmoid, the connective more or less produced below the cells, anteriorly bilobate or bituberculate; ovary commonly 4-celled; fruit capsular; seeds cochleate, minutely tuberculate.—A few other species are found in Central America. Most of the species of this large genus are South American.

Tibouchina bipenicillata (Naud.) Cogn. Reported from El Rodeo de Pacaca and San Mateo. Panama to Colombia and Venezuela. A shrub or small tree, the branches densely pale-squamose; leaves ovate-oblong, thick, 6–10 cm. long, short-petiolate, 5-nerved, acuminate, setulose-strigose above, sparsely so beneath, principally on the nerves; flowers panicled, mostly pedicellate; calyx tube 8 mm. long, densely covered with appressed setae, the lobes 3 mm. long; petals 8–10 mm. long; capsule 1 cm. long.

Tibouchina Bourgaeana Cogn. Rancho Redondo; valley of Río Sucio; region of El General. Extending to Mexico. Similar to the more common *T. longifolia;* branches densely appressed-setulose; leaves narrowly lanceolate, long-acuminate, attenuate at the base, 5-nerved, appressed-pilose; flowers small, in small cymes; calyx tube 2.5 mm. long, the subulate lobes only 1.5–2 mm. long.

Tibouchina ciliaris (DC.) Cogn. Reported from Puntarenas. Colombia. A small shrub, the branches long-hirtellous; leaves ovate-oblong, membranaceous, 4–8 cm. long, short-acuminate, serrulate, 5-nerved, densely setulose; panicles small, corymbiform; calyx rather sparsely setulose, the tube 5 mm. long, the lobes 2–2.5 mm. long, triangular; petals white to purple; capsule 6 mm. long.

Tibouchina erythrophylla Gleason, Phytologia 1: 133. 1935. Yerba Buena, northeast of San Isidro, Prov. Heredia, 2,000 meters, *Standley & Valerio 49048.* Known only from the region of the type. Stems diffuse, prostrate, setose at the nodes, sparsely pubescent elsewhere with curved-ascending hairs; leaves short-petiolate,

ovate, 11 mm. long or less, acute, broadly cuneate at the base, entire, 5-plinerved, white-villosulous above, glabrous beneath and red; flowers solitary, long-pedicellate; calyx tube 3.8 mm. long, narrowly 4-winged, the lobes 1.5 mm. long.

Tibouchina longifolia (Vahl) Baill. Common in thickets or forest, often in cultivated or waste ground, chiefly at middle elevations but descending almost or quite to the coasts, and ascending sometimes to 2,000 meters or more; region of San Ramón. Mexico to West Indies and Bolivia. Plants erect, herbaceous or suffrutescent, sometimes 1.5 meters high but usually much lower, often much branched, slender; stems densely setulose with spreading or ascending hairs; leaves short-petiolate, lanceolate or oblong, 5–10 cm. long, usually entire, 5-nerved, densely appressed-setulose on both surfaces; flowers in small, leafy, compact or open panicles; calyx rather sparsely long-setulose, the tube 3 mm. long, the narrow lobes 3–4 mm. long; petals white or pale pink, 5–6 mm. long; capsule 3 mm. in diameter. A rather weedy plant, one of the most plentiful representatives of the family in many parts of Central America.

Tibouchina Mathaei Cogn. Region of San Ramón; El Rodeo de Pacaca; San Pedro de Calabaza to Sabana de Los Chiquizás. Peru. A tall, rather stout shrub, the branches densely and closely pale-squamose; leaves stiff, short-petiolate, ovate-oblong, 5–13 cm. long, acute, obtuse at the base, 5–7-nerved, densely appressed-setose above, covered beneath with appressed, linear squamae; panicles small and dense, many-flowered, the flowers sessile; calyx densely squamose, the tube 8–9 mm. long, the lobes 3–4 mm. long; petals purple-violet, 12–15 mm. long. Unlike most other Central American species of *Tibouchina*, this must be a handsome and showy plant. Many of the South American species are noted for their large and exceedingly handsome blossoms.

Tibouchina monticola (Naud.) Cogn. Reported by Cogniaux from Tres Ríos. Southern Mexico. Similar to *T. longifolia;* stems soft-pilose; leaves oblong or ovate-oblong, 2–6 cm. long, entire, densely villosulous; flowers solitary or in small cymes; calyx densely villous with eglandular hairs, the tube 5 mm. long, the lobes linear-subulate, 3–4 mm. long; petals purplish, 1 cm. long.

Tibouchina nana (Standl.) Gleason. *T. Oerstedii* var. *subsessiliflora* Cogn. in DC. Monogr. Phan. 7: 269. 1891 (Carrillo, 300 meters, *Pittier*). *Chaetolepis nana* Standl. Also at La Palma de San José, 1,500 meters. Panama. Stems prostrate and rooting,

setose-pilose; leaves short-petiolate, ovate, 1–2 cm. long, obtuse or acutish, 7-plinerved, entire, setulose-ciliate, appressed-pilose and appressed-setose on the upper surface, densely appressed-pilose beneath; flowers solitary, long-pedicellate; calyx tube 4 mm. long, appressed-setulose-pilose, the lobes 2 mm. long; petals white or purple.

Tibouchina Oerstedii (Triana) Cogn. in Mart. Fl. Bras. 14, pt. 4: 597. 1888. *Pterolepis Oerstedii* Triana, Trans. Linn. Soc. 28: 40. 1871. Candelaria, *Oersted.* In forest, El Tablazo; apparently common in the region of San Ramón, 1,000–1,500 meters. Endemic. Plants slender, herbaceous, procumbent or prostrate, the stems sparsely setulose; leaves ovate, 1–2.5 cm. long, acute, entire, 5–7-plinerved, appressed-pilose on both surfaces, with no setae intermixed; flowers long-pedicellate, solitary, the pedicels filiform, often 2–3 cm. long; calyx tube acutely tetragonous, scarcely setulose, 4 mm. long, the narrow, long-attenuate lobes 4–5 mm. long or in age much longer; capsule 6–7 mm. long.

Tibouchina paradoxa Kraenzl. Vierteljahr. Naturf. Gesell. Zürich 76: 147. 1931. Río Naranjo, 200 meters, *Tonduz 7628.* Stems flaccid, branched, glabrous below, densely appressed-setose above; leaves sessile, lanceolate, 3-nerved, pale beneath, acuminate, appressed-pilose beneath, especially on the nerves, 16 mm. long or less; flowers in lax panicles opposite the leaves, pedicellate; calyx tube conic-campanulate, pilose with gland-tipped and eglandular hairs intermixed, the lobes triangular, obtuse, short; petals 3.5 mm. long. Known to the writer only from description; referred doubtfully to the genus by Kraenzlin.

TOCOCA Aubl.

Shrubs, glabrous or hispid; leaves large, often unequal, petiolate, membranaceous or coriaceous, entire or denticulate, usually 5-nerved, the petiole or blade often bearing inflated formicaria; flowers medium-sized, in terminal and often also lateral panicles, commonly 5-parted; calyx tube campanulate, terete or costate, the limb dilated, obtusely or acutely lobate, the outer teeth short or elongate; petals obtuse or retuse; stamens 10, equal or nearly so, the filaments thickish, glabrous, the anthers linear, straight or somewhat recurved, the connective not produced below the cells, often tuberculate or short-calcarate anteriorly; ovary commonly 3-celled; fruit baccate; seeds obovoid or pyramidal, not curved, smooth or granulate.—One or two additional species are native in Central America.

Tococa grandifolia Standl. Cataratas de San Ramón, *Brenes 13529*. Honduras and British Honduras. A stout shrub 2–3.5 meters high, the stems densely setose-hispid with very long, stiff, spreading hairs; leaves petiolate, broadly elliptic or rounded-elliptic, mostly 25–30 cm. long and 16–23 cm. wide, rounded and cuspidate-acuminate at the apex, broadly rounded at the base, 5-nerved, glabrous above, setose-hispid and stellate-furfuraceous beneath along the nerves; panicles dense and many-flowered, the flowers sessile, congested; calyx furfuraceous-puberulent or glabrate, 4–5 mm. long; fruit purple-red, 5-celled, 4–5 mm. in diameter.

Tococa platyphylla Benth. Carrillo; La Hondura de San José, 1,300 meters. Colombia and Venezuela. Plants stout, probably shrubby, the stems setose-hispid at the nodes; leaves broadly elliptic or rounded, mostly about 20 cm. long or larger, glabrous above, puberulent beneath on the nerves, rounded and apiculate at the apex, 7-plinerved; panicles small and dense, the flowers pink; calyx 4–5 mm. long, glabrate.

TOPOBEA Aubl.

Shrubs or trees, glabrous or variously pubescent, sometimes scandent or epiphytic; leaves petiolate or sessile, large or small, 5–7-nerved, the transverse veins usually very numerous and close together; flowers medium-sized, axillary or from defoliate branches, solitary or fasciculate, pink or white, 6-parted, subtended by closely imbricate bracts, these usually shorter than the calyx, free or connate; calyx tube hemispheric or campanulate, the limb short or elongate, truncate, dentate, or lobate; petals obtuse or acute; stamens twice as many as the petals, equal or nearly so, the filaments filiform, the anthers subulate, incurved, rostrate and minutely 1-pored at the apex, the connective not produced below the cells, not appendaged anteriorly; ovary glabrous, 4–6-celled; fruit baccate; seeds obovoid, punctulate.—A few other species probably occur in Central America.

Topobea Brenesii Standl., sp. nov.—Arbuscula 3–3.5 m. alta, ramis teretibus pallide cinnamomeis, novellis densissime paleaceo-hispidis atque stellato-tomentosis, pilis brunnescentibus, internodiis plerumque brevibus; folia inter minora sessilia vel brevissime petiolata, petiolo vix ad 5 mm. longo crasso dense tomentoso; lamina crasse membranacea vel subcoriacea oblonga vel obovato-oblonga 4–8.5 cm. longa 1.8–3.8 cm. lata subacuta, apice ipso obtuso, basi rotundata, truncata vel emarginata, integra, supra glabra vel

glabrata, subtus puncticulata in sicco fusco-brunnescens ad nervos sparse paleacea vel stellato-puberula, aliter glabra, in statu juvenili interdum inter venas stellato-puberula sed cito glabrata, trinervia, venis transversis paullo obliquis tenerrimis; flores plerumque solitarii breviter crasse pedicellati, pedicello ad 5 mm. longo densissime paleaceo; bracteae omnes calyce paullo breviores extus densissime hispidulae atque stellato-furfuraceae, exteriores breviter connatae, parte terminali late rotundata patente vel subrecurva; hypanthium 5 mm. longum globosum adpresso-furfuraceum, calyce fere aequilongo 1 cm. lato profunde 6-lobato, lobis apice late rotundatis; petala spathulata 1.5 cm. longa apice late rotundata vel obtusa et apiculata, extus minute squamosa; antherae 4 mm. longae attenuatae, connectivo basi minute calcarato, filamentis gracilibus.—La Palma de San Ramón, 1,250 meters, March, 1929, *Brenes 6732* (type in Herb. Field Mus.); March, 1935, *Brenes 20457*. Socorro de San Ramón, 1,125 meters, *Brenes 5663*. La Palma y El Socorro de San Ramón, *Brenes 6208*. Very unlike other Costa Rican species in its abundant pubescence and sessile or subsessile leaves.

Topobea calycularis Naud. Cañas Gordas, 1,100 meters. Panama to Mexico. A shrub or small tree, the branches sparsely paleaceous or glabrate; leaves coriaceous, oblong or elliptic-oblong, 10–16 cm. long, abruptly long-caudate-acuminate, acute at the base, 5-plinerved, glabrous or sometimes hispid beneath on the nerves near their base; flowers very short-pedicellate, fasciculate, the pedicels usually 5 mm. long or less; bracts coriaceous, closely appressed, connate, 3–5 mm. long; calyx truncate and minutely 6-dentate, 7–8 mm. long, glabrous; petals white or pink, subacute, 8 mm. long.

Topobea Durandiana Cogn. Bull. Soc. Bot. Belg. 30, pt. 1: 268. 1891. Buenos Aires, *Pittier 3789*. Pacific tierra caliente; El General; Aguacaliente, at 1,650 meters. Endemic. A small tree or shrub, the branches thick, furfuraceous-puberulent at first; leaves long-petiolate, coriaceous, oblong-elliptic to broadly ovate or elliptic, mostly 15–22 cm. long, abruptly acuminate, obtuse or rounded at the base, 5-plinerved or 5-nerved, glabrous above, sparsely furfuraceous or almost glabrous beneath; flowers 6-parted, fasciculate, the pedicels 1.5–2 cm. long; bracts connate, rounded, closely appressed, coriaceous, minutely apiculate, half as long as the calyx, glabrate; calyx 10–12 mm. long, truncate, minutely 6-denticulate; petals 1.5 cm. long.

Topobea Maurofernandeziana Cogn. in DC. Monogr. Phan. 7: 1193. 1891. Juan Viñas, *Tonduz.* Frequent in the upper part of the Atlantic tierra caliente, ascending in the mountains of the central region to 2,500 meters; region of San Ramón. A shrub or small tree, often epiphytic, glabrous almost throughout; leaves long-petiolate, subcoriaceous, elliptic to rounded, mostly 15–20 cm. long, rounded at the apex and apiculate, rounded at the base, 5-plinerved; flowers mostly fasciculate, the pedicels chiefly 1.5–2.5 cm. long; bracts thick-coriaceous, 7–9 mm. long, the inner ones obovate, free, the outer ones suborbicular, short-connate at the base; calyx 11–12 mm. long, minutely 6-denticulate; petals white or pink, thick, 12–13 mm. long, obliquely subtruncate at the apex.

Topobea Pittierii Cogn. in DC. Monogr. Phan. 7: 1088. 1891. La Palma, 1,550 meters, *Pittier.* Endemic. A shrub of 3–4 meters, the young branches sparsely furfuraceous; leaves ovate-elliptic, 8–12 cm. long, shortly caudate-acuminate, acute at the base, 6-plinerved, glabrous; flowers fasciculate, the slender pedicels 1.5–3 cm. long; bracts coriaceous, closely appressed, glabrate, only 1–1.5 mm. long; calyx 5 mm. long, lobate; petals acuminate, 5 mm. long; fruit subglobose, 6–7 mm. in diameter. Noteworthy for the very small bracts.

Topobea Storkii Standl., sp. nov.—Frutex vel arbuscula fere omnino glabra, ramulis subgracilibus subteretibus, ad nodos sparse furfuraceis; folia inter minora coriacea petiolata, petiolo ca. 1.5 cm. longo; lamina elliptico-oblonga 7–10.5 cm. longa 3–4.5 cm. lata, obtusa, basi subacuta et abrupte breviter decurrens, glabra, 5-plinervia, nervis exterioribus tenerrimis; flores ad nodos fasciculati, pedicellis crassiusculis plerumque 1.5–2 cm. longis; bracteae coriaceae arcte adpressae calyce paullo breviores, interioribus in cupulam truncatam omnino connatis, exterioribus fere ad apicem connatis 1.5 cm. longis, apicibus liberis late rotundatis glabris; calyx (apertus non visus) obovoideus glaber 1.5 cm. longus truncatus minute 6-denticulatus.—La Chonta, near Santà María de Dota, May, 1928, *H. E. Stork 2308* (type in Herb. Field Mus.).

TRIOLENA Naud.

Glabrous or variously pubescent herbs; leaves rather large, petiolate, entire or serrulate, 5–7-plinerved; flowers small, 5-parted, in scorpioid spikes or racemes; calyx tube campanulate, in age 3-winged, the lobes acute, equaling or shorter than the tube; petals obovate; stamens 10, subequal, the filaments glabrous, the anthers

unlike, linear-oblong, 1–2-pored at the apex, the larger ones with the connective more or less produced below the cells and with 3 filiform appendages anteriorly; ovary 3-celled; fruit capsular, 3-winged; seeds clavate or obpyramidal, truncate, roughened.—One other Central American species is found in Guatemala.

Triolena hirsuta (Benth.) Triana. Frequent in forests of the Atlantic tierra caliente; region of San Ramón. Extending to Ecuador. Plants herbaceous or suffrutescent, simple, usually 50 cm. high or less, like the petioles and inflorescence densely villous-hirsute; leaves short-petiolate, oblong-ovate, mostly 8–15 cm. long, thin, acute or acuminate, obtuse or subacute at the base, entire or nearly so, sparsely setose above, hirtellous beneath, especially on the nerves; flowers short-pedicellate, the calyx densely hirsute.

ONAGRACEAE. Evening Primrose Family

Herbs, shrubs, or small trees; leaves opposite or alternate, entire or dentate, without stipules; flowers small or large, generally perfect and axillary, regular or irregular; calyx tube united with the ovary and produced above it, the limb usually 4-parted; petals commonly 4, contorted; stamens 1–8, the anthers oblong or linear; style filiform, the stigma entire or 4-lobate; fruit fleshy or dry.—One or two other genera are represented in Central America.

FUCHSIA L.

Shrubs or small trees, sometimes epiphytic; leaves opposite or alternate; flowers small or large, pink, red, or purple, axillary or racemose or paniculate; calyx tube short or elongate; stamens 8; fruit a 4-celled berry, with few or numerous seeds.—Other species occur in Central America.

Fuchsia arborescens Sims. *Achiotillo* (Irazú, probably an erroneous name). Common in forests and pastures in the elevated parts of the central region, at 1,400–2,800 meters. Ranging to Mexico. A shrub or tree, sometimes 10 meters high, the crown dense and rounded; leaves opposite or ternate, oblanceolate-oblong, glabrous, 7–20 cm. long, acute or acuminate, serrulate or entire; flowers very numerous, purple and pink, in terminal panicles, about 12 mm. long; berries black. An unusually beautiful and showy tree, especially when standing alone and symmetrical in growth in the pastures of Irazú and Turrialba, where it is abundant. Sometimes it grows as an epiphytic shrub. The berries, like those of other species, are sweet and edible.

Fuchsia microphylla HBK. Forests of the mountains of the central region, but not common. Extending to Mexico. A terrestrial shrub of 1–2 meters, the branches puberulent; leaves ovate or orbicular, usually 5–20 mm. long, obtuse or acute, almost glabrous, serrulate; flowers axillary, pendulous, 10–14 mm. long, reddish purple, the calyx glabrous; berries dark purple.

Fuchsia parviflora Zucc. Common in forests of the mountains of the central region, at 2,000–3,000 meters. Ranging to Mexico. A branched shrub of 1–2 meters, the branches puberulent, leaves ovate-lanceolate to elliptic, 1–5 cm. long, acute or obtuse, denticulate or entire, glabrous; flowers reddish purple, 8–15 mm. long, the calyx pubescent; berries black. This species and the preceding one are closely related and it is probable that the Costa Rican specimens referred to them represent a single species.

Fuchsia speciosa Hort. *Fusia.* A plant probably of South American origin, cultivated commonly in hanging baskets or in gardens.

Fuchsia splendens Zucc. Forests of the mountains of the central region, at 2,850–3,000 meters. Ranging to southern Mexico. A small, woody epiphyte, the branches pubescent; leaves ovate or ovate-cordate, 5–12 cm. long, acuminate, serrulate, pubescent, the petioles very long; flowers axillary, 4 cm. long, pink or reddish, pendent, the pedicels elongate; berries as much as 4 cm. long. A highly ornamental plant, because of its large and beautiful flowers.

HAUYA DC.

Shrubs or trees; leaves alternate, petiolate, entire; flowers large, axillary, solitary, sessile or nearly so; calyx tube cylindric, long-produced beyond the ovary, the limb 4-lobate; petals 4, obovate, sessile; stamens 8, the anthers linear; ovary 4-celled; capsule elongate, terete, ligneous, 4-celled, loculicidally 4-valvate; seeds numerous, winged.—Several other species are known from Central America.

Hauya lucida Donn. Smith & Rose, Bot. Gaz. 52: 48. 1911. *Supara.* Río Torres, San Francisco de Guadalupe, near San José, 1,170 meters, *Tonduz 8005.* A rare, endemic species, known also from the region of Dulce Nombre, south of Cartago, and from San Ramón; planted in the Parque Bolívar in San José. A tree of 4–6 meters, the crown rounded and dense, the bark resembling that of *Psidium Guajava;* leaves elliptic, petiolate, acuminate, entire, glabrous; flowers axillary, almost sessile, 8–10 cm. long, probably pink;

petals 3 cm. long; stamens 8; fruit a woody capsule, terete, narrow, 3–4.5 cm. long. The large flowers suggest those of the genus *Fuchsia*. This species has been referred incorrectly to *H. Rodriguezii* Donn. Smith, of Guatemala.

JUSSIAEA L.

Small or large herbs, glabrous or pubescent; leaves alternate, entire; flowers large or small, yellow, axillary, the calyx tube short or elongate; sepals 4–6, green; petals caducous; stamens 8–12; fruit a short or narrow and elongate capsule.—Other species exist in Central America.

Jussiaea affinis DC. Swampy places of the tierra caliente. Widely distributed in tropical America. An erect, branched herb, pubescent or pilose; leaves elliptic-oblong, acute; flowers sessile; capsule terete, elongate; sepals 4.

Jussiaea decurrens Walt. Wet places of the tierra caliente. Widely dispersed in tropical America. An erect, almost glabrous herb, the branches narrowly winged; leaves narrowly lanceolate, attenuate; flowers short-pedicellate; sepals 4; capsule 4-angulate, narrowly winged along the angles, elongate.

Jussiaea erecta L. Reported from the vicinity of San José, perhaps in error. A species of wide distribution. A branched herb, almost glabrous; leaves lanceolate; capsule short, 4-angulate, the angles not winged.

Jussiaea geminiflora Donn. Smith, Bot. Gaz. 23: 246. 1897. *Clavel del monte*. Junction of the rivers Puerto Viejo and Sarapiquí, *Biolley 7379*. Common in moist places of the tierra caliente, sometimes in banana plantations. Panama. Plants herbaceous or somewhat woody, as much as 3 meters high, almost glabrous; leaves oblong-lanceolate, acuminate; flowers solitary or geminate, short-pedicellate; capsule obovoid, 1 cm. long, the angles rounded.

Jussiaea linifolia Vahl. Cocos Island, and probably in various parts of the mainland. A species of wide distribution. A glabrous or nearly glabrous herb; leaves petiolate, lanceolate, acuminate; flowers sessile, with 4 sepals; capsule slender, elongate, terete.

Jussiaea lithospermifolia Kunth ex Micheli. Reported from the region of El General, collected by Skutch. Extending to Colombia and Brazil. Plants suffrutescent, glabrous or pubescent; leaves sessile, lanceolate, acute, small; flowers short-pedicellate, 4-parted;

calyx lobes lanceolate, acute; capsule narrowly obconic, tetragonous, 12 mm. long, 4 mm. thick. I have seen no Central American material of the species.

Jussiaea peploides Humb. & Bonpl. Meseta Central to the coasts, in muddy places. Widely distributed in tropical America. Plants glabrous and somewhat succulent, prostrate; leaves small, oblanceolate, obtuse or acute, mostly 3 cm. long or less; flowers pedicellate; capsule elongate, terete.

Jussiaea peruviana L. *J. hirta* Vahl. Common in many places, Meseta Central to the coasts, often growing on the banks of small streams; region of San Ramón. Widely distributed in tropical America. An erect, branched herb, or sometimes a woody vine and as much as 6 meters long, densely pilose; leaves lanceolate or oblong, petiolate; pedicels elongate; capsule about 2 cm. long, thick, 4-angulate; sepals 4. A showy plant because of its yellow flowers, larger than those of other species.

Jussiaea repens L. Meseta Central, usually floating on quiet water, or in muddy soil. Widely distributed in tropical America. A glabrous, succulent herb; leaves petiolate, oblong or oblanceolate, obtuse; flowers pedicellate, small, with 4 sepals; capsule elongate, terete.

Jussiaea suffruticosa L. *Clavelillo.* Common in moist or swampy places, Meseta Central to the coasts. Widely dispersed in tropical America. An erect herb as much as 1.5 meters high, somewhat pilose or almost glabrous, branched; leaves lanceolate, attenuate; flowers pedicellate, with 4 sepals; capsule terete, elongate; seeds unlike those of other species, swollen on one side and appearing as if 2-celled.

LOPEZIA Jacq.

Erect, branched, brittle, usually annual, glabrous or pubescent herbs; leaves alternate or the lowest opposite, petiolate, dentate; flowers small, racemose or subcorymbose, pedicellate; calyx tube subglobose at the base, scarcely produced beyond the ovary, the limb colored, 4-parted, unequal, deciduous, the lobes linear; petals 4, unguiculate, very unequal; stamens 2, one of them sterile and petaloid, the filaments short, dilated at the base, the anther linear-oblong; ovary 4-celled; capsule globose, 4-celled, loculicidally 4-valvate.—Other species are native in northern Central America.

Lopezia paniculata Seem. Common in thickets or open places in the mountains of the central region, at 1,200–1,800 meters; San Ramón, at 1,100 meters. Panama. An erect, much branched herb a meter high, the branches elongate, pubescent; leaves lanceolate or ovate, acute, denticulate or entire, somewhat pubescent; flowers small, axillary, the pedicels elongate and filiform; sepals dark red; petals white; fruit a small, globose capsule.

LUDWIGIA L.

Annual or perennial herbs; leaves opposite or alternate, narrow, entire; flowers usually axillary, solitary, and sessile; calyx tube cylindric to turbinate, not produced above the ovary, the 3–5 lobes persistent or tardily deciduous; petals 3–5 or none; stamens 3–5, the filaments short, the anthers ovoid or oblong; ovary 4–5-celled, the stigma capitate, 3–5-lobate; capsule terete or angulate, septicidal or dehiscent by apical pores.—One other Central American species occurs in Honduras.

Ludwigia palustris (L.) Ell. var. **americana** (DC.) Fernald & Griscom. *Isnardia palustris* L. Capulín, Prov. Alajuela, on sandbars (*arenales*) along a stream. A species of wide distribution. A glabrous herb, prostrate or ascending; leaves opposite, petiolate, obovate or spatulate, 1–2 cm. long, acute or obtuse, entire; flowers minute, axillary, sessile, the petals minute and reddish or none; stamens 4; fruit capsular, 3 mm. long.

OENOTHERA L. Evening primrose

Herbs, the leaves alternate, entire or dentate, sometimes pinnatifid; flowers axillary, large or small, of various colors; calyx tube short or elongate, produced above the ovary into a slender tube; petals 4, sessile; stamens 8; fruit capsular.

Oenothera biennis L. Sometimes cultivated in gardens as an ornamental plant. Native of the United States. A tall, biennial herb, with large, yellow flowers.

Oenothera cuprea Schlecht. Common in meadows of the central mountains, at 1,800–3,300 meters. Ranging to Mexico. Plants perennial, procumbent, covered with short hairs; leaves small, almost sessile, entire; petals 5 mm. long, at first yellow, later dark red; capsule almost sessile, obovoid, narrowly winged.

Oenothera rosea Ait. *Hartmannia rosea* Don. Common in pastures and other grassy places of the Meseta Central. Ranging

to Mexico and Colombia. An erect, branched herb, 30–60 cm. high, pubescent with short, appressed hairs; lower leaves pinnatifid, the upper denticulate or entire; flowers pedicellate, the petals pink, 1 cm. long; capsule small, obovoid, stipitate, angulate.

Oenothera tetraptera Cav. Grassy places about San José and Cartago. Ranging to Mexico and the southern United States. A perennial herb, pilose with long, spreading hairs; leaves pinnatifid or dentate; flowers pink, the petals 2–3 cm. long; capsule pilose, acutely angulate.

HALORRHAGACEAE

GUNNERA L.

Giant, acaulescent, perennial herbs, with thick rhizomes; leaves very large, petiolate, lobate and serrate; inflorescence large, the flowers minute, in racemed spikes; calyx tube ovoid or compressed, 2-lobulate; petals 2 or none; stamens 2, inserted upon the petals; fruits minute, drupaceous.

Gunnera insignis (Oerst.) A. DC. in DC. Prodr. 16, pt. 2: 597. 1868. *Higuera. Pankea insignis* Oerst. Vid. Medd. Kjoebenhavn 189. 1857. Volcán de Irazú, *Oersted.* Common in quebradas of the central volcanoes, at 1,500–2,400 meters; region of San Ramón, at 1,000 meters. Panama. Plants very large, the leaves reniform, 1–2 meters broad, rough, lobate and dentate; inflorescences hidden beneath the leaves, reddish, their branches 6–8 cm. long, very dense. A plant of striking and ornamental appearance, well known in the regions that it inhabits. The great leaves are often employed like umbrellas in the case of unexpected showers in the mountains, and they are sufficiently large to afford good protection to a man against a heavy downpour. Material from Guatemala represents either this species or a closely related one. The genus is unknown in other parts of Central America.

Gunnera Wendlandii Reinke, Morphol. Abh. 111. 1873, nomen; Schindler, Pflanzenreich IV. 225: 127. 1905. Collected at Desengaño by Wendland, *No. 829.* Differing from the preceding species in the longer (30 cm.) branches of the inflorescence. Probably nothing more than a form of *G. insignis.*

MYRIOPHYLLUM L.

Glabrous, aquatic herbs, the branches usually floating, densely leafy; leaves opposite, alternate, or verticillate, usually narrow, entire to serrate or pectinate-pinnatifid; flowers minute, axillary,

sessile or short-pedicellate, sometimes in terminal spikes, the upper ones staminate, the lower perfect, usually monoecious; staminate flower with a very short calyx tube, the limb normally 4-lobate, the petals 2–4, sessile, the ovary none or rudimentary; stamens 2–8, the filaments filiform, the anthers linear-oblong, basifixed; calyx tube of the pistillate flower 4-sulcate, the lobes none or 4 and minute, the petals minute or none; ovary commonly 4-celled, the ovules solitary in the cells; fruit nutlike or drupaceous, separable into 4 cocci.—No species are known to be native in Central America.

Myriophyllum brasiliense Camb. *M. proserpinacoides* Gill. Sometimes grown as an ornamental plant in fountains. Native of Brazil and southeastern South America. An aquatic plant with verticillate leaves, most of which are pinnately divided into narrow segments, the minute flowers dioecious, green, sessile in the leaf axils. In the United States, where the plant likewise is often cultivated, it is known by the name Parrot's feather. It has become thoroughly naturalized in the southern United States.

ARALIACEAE. Ginseng Family

Shrubs or trees (in the Costa Rican species), the leaves alternate or rarely opposite, simple or compound, often palmate-lobate; stipules usually present and adnate to the petiole; pubescence often of branched hairs; flowers small, usually greenish, umbellate or capitate, perfect, polygamous, or rarely dioecious, regular; calyx tube adnate to the ovary; petals commonly 5, often coherent, inserted on the margin of the calyx; stamens as many as the petals and alternate with them, the anthers introrse; ovary inferior, 1–several-celled, with 1 ovule in each cell, the styles as many as the cells; fruit fleshy; seeds flattened or somewhat 3-angled.—The genus *Aralia* is represented in northern Central America.

DIDYMOPANAX Dcne. & Planch.

Large trees; leaves long-petiolate, digitately compound, the leaflets long-petiolulate, entire; flowers in panicled umbels; calyx 5-dentate; petals 5, valvate; stamens 5, the filaments short, the anthers ovoid; ovary 2-celled, the 2 styles distinct; fruit laterally compressed, didymous, only slightly fleshy.—No other species are found in Central America.

Didymopanax Morototoni (Aubl.) Dcne. & Planch. *Pava, Pavo, Pavilla.* Reported from Buenos Aires, Pacific tierra caliente; probably in the Atlantic lowlands, since the tree is common in most

parts of the Atlantic tierra caliente of Central America. Southern Mexico to West Indies and northern South America. A large tree, as much as 25 meters high; leaves very large, the petioles greatly elongate, the leaflets 7–10, elliptic or oblong, 20–40 cm. long, acuminate, often subcordate at the base, densely pale-tomentose beneath; panicles large, with very numerous small umbels, the pedicels 2–6 mm. long; petals white; fruit glaucous, 6–7 mm. broad. A characteristic tree of wet forests of the Central American tierra caliente, often forming a conspicuous part of the understory forest; prominent because of the large leaves of distinctive form, pale on the under surface. The wood is light in weight, soft, rather close-grained, rather brittle, and not durable. Leaves of young plants often have no tomentum but are hispid on the upper surface. In Panama the tree is called also Mangabé and Gargorán.

Didymopanax Pittieri March. Bull. Soc. Bot. Belg. 30, pt. 1: 280. 1891. Potrero del Alto, Volcán de Poás, 2,460 meters, *Pittier 797*. Frequent in forests of the central mountains, chiefly at 2,000–2,800 meters; region of San Ramón, 1,200–1,300 meters. Panama. A tree as much as 20 meters high, glabrous throughout; leaves comparatively small, on very long petioles, the leaflets 5–8, ovate-elliptic, 8–17 cm. long, long-acuminate, rounded or obtuse at the base; fruits 3–4 mm. in diameter, purple or almost black.

GILIBERTIA Ruiz & Pavón

Glabrous shrubs or trees, the leaves simple, entire or lobate, commonly pinnate-veined; flowers small and greenish, umbellate, the umbels racemose or paniculate, sometimes umbellate or solitary; calyx 5-dentate or subentire; petals 5, valvate; stamens 5, the anthers ovate or oblong; ovary 5-celled, the styles connate; fruit globose or ovoid, fleshy, commonly 5-sulcate.—A few additional species are known from Central America.

Gilibertia arborea (L.) March. *Zopilote, Cacho de venado. Dendropanax arboreum* Dcne. & Planch. *D. monticola* Standl. Journ. Wash. Acad. Sci. 17: 316. 1927 (wet forest near Fraijanes, Prov. Alajuela, 1,600 meters, *Standley & Torres 47538*). Frequent in forests and often in second growth, tierra caliente of both slopes, ascending the slopes of the central mountains to 2,400 meters; region of San Ramón. Distributed almost throughout tropical America. A rather sparsely branched tree, or often only a shrub, sometimes 20 meters high; bark gray, slightly roughened; leaves extremely variable, those on sterile plants often deeply palmate-

lobate, the lobes entire, those of older branches ovate to elliptic or obovate, entire or undulate, long-petiolate; umbels usually numerous and racemose, sometimes few and subumbellate, the peduncles not jointed; fruit black or dark purple, very juicy, 6–8 mm. in diameter. The wood is described as fibrous, rather heavy, and yellow, with reddish heartwood; it is little used. This species is noteworthy for the great variation exhibited by the leaves, those of young branches being often very unlike the adult foliage. Numerous segregates of the species have been proposed, based in large part upon foliage characters, but Dr. A. C. Smith, monographer of the North American species, has reduced most of them to synonymy. To the present writer it seems probable that more careful study of the Central American forms, in association with intimate knowledge of Central American physiography, will result in restoration of a number of the species that have been proposed. *Dendropanax monticola* is a form of the high mountains, noteworthy for its small leaves with rounded bases. Although reduced by Dr. Smith, I suspect that further study will show it to be well worthy of specific status.

Gilibertia diplostemona Donn. Smith is *Hydrangea diplostemona* (Donn. Smith) Standl. (Saxifragaceae).

Gilibertia gonatopoda Donn. Smith, Bot. Gaz. 55: 434. 1913. Banks of Río Turrialba, Prov. Cartago, 500 meters, *J. D. Smith 4829*. Forests of the Atlantic tierra caliente; region of San Ramón, ascending to 1,600 meters. Panama. A medium-sized tree; leaves large, long-petiolate, elliptic or broadly elliptic, 15–30 cm. long, 5–18 cm. wide, abruptly short-acuminate, obtuse or rounded at the base; umbels numerous, racemose, the peduncles conspicuously jointed below the middle; fruit 4 mm. in diameter.

Gilibertia praestans (Standl.) A. C. Smith. Sterile specimens collected by the writer at Laguna de La Escuadra, near El Copey, at 2,100 meters, probably are referable to this species. Region of Chiriquí, Panama. A small tree; leaves long-petiolate, some of them digitately 3–5-lobate, the lobes coarsely sinuate-serrate, other leaves ovate-oblong to ovate, acuminate, and sinuate-serrate; umbels few, umbellate; fruit 5–6 mm. broad; peduncles not jointed.

Gilibertia querceti Donn. Smith, Bot. Gaz. 55: 436. 1913. *Dendropanax querceti* Donn. Smith, op. cit. 42: 297. 1906. Forests at El Copey, Prov. Cartago, 1,800 meters, *Tonduz 11826*. Frequent in the forests of Dota, and in the region south of Cartago; region of San Ramón; mostly at 850–1,800 meters. Endemic. A shrub

or tree of 6 meters or less; leaves short-petiolate, small, oblong-lanceolate or oblanceolate-oblong, mostly 5–10 cm. long, acuminate, attenuate to the base, entire or denticulate; umbels solitary, the peduncles not jointed; flowers greenish white; fruit black, juicy, 4–5 mm. in diameter.

HEDERA L. Ivy

Scandent shrubs, the leaves entire or lobate; flowers in small, panicled umbels; calyx entire or 5-dentate; petals 5, valvate; stamens 5, the anthers ovate, straight or recurved-reniform; ovary 5-celled, the styles connate; fruit subglobose, the exocarp juicy, the pyrenes ovoid-triquetrous.—The members of the genus are natives of the Old World.

Hedera Helix L. *Hiedra.* The common ivy or English ivy, native of Europe, a handsome vine with very thick and leathery, somewhat lobate leaves, is cultivated occasionally in gardens of the tierra templada, as at Cartago.

NOTHOPANAX Miq.

Shrubs, glabrous or nearly so; leaves thin, digitately or pinnately compound, the leaflets usually dentate or incised; flowers umbellate, the umbels racemose or paniculate, the pedicels articulate below the flower; calyx 5-dentate or subentire; petals 5, valvate; stamens 5, the anthers ovate or oblong; ovary 2–3-celled, the styles distinct, erect or recurved; fruit usually compressed laterally, the exocarp fleshy, the pyrenes compressed.—The species are natives chiefly of the Pacific islands and the East Indies.

Nothopanax fruticosum (L.) Miq. Cultivated commonly for ornament in the tierra caliente, and probably in the temperate region. A favorite ornamental plant in Central America, much planted for hedges. *N. fruticosum* has twice pinnate leaves whose leaflets usually are bordered with white, and often much cut or parted, so that the leaves have a plumelike appearance. Two other species grown in Central America, and probably in Costa Rica, both with once pinnate leaves, are *N. ornatum* (Bull.) Merrill, with 11–17 green leaflets; and *N. Guilfoylei* (Cogn. & Marché) Merrill, with 5–7 leaflets which are usually margined or blotched with white.

OREOPANAX Dcne. & Planch.

Shrubs or trees, glabrous or often pubescent; leaves simple and entire or lobate, or digitately compound, the few or numerous

leaflets entire or dentate; flowers capitate, the heads racemose or paniculate, polygamous-dioecious; calyx subentire; petals usually 5, valvate; ovary commonly 3–5-celled, the styles elongate, free or more or less connate; fruit globose, juicy.—A few other species are known from Central America.

Oreopanax capitatum (Jacq.) Dcne. & Planch. Frequent in forests of the Atlantic tierra caliente and at middle elevations in the central mountains; region of San Ramón; ascending to about 2,000 meters. Southern Mexico to West Indies and South America. A shrub or tree, often epiphytic, sometimes 15 meters high; bark somewhat rough, brown or dark brown; leaves on greatly elongate petioles, very variable in outline but mostly ovate to broadly rounded-ovate, obtuse or abruptly short-acuminate, rounded or cordate at the base, entire, glabrous; flower heads few-flowered, very dense, racemose or paniculate, the inflorescence glabrous. This species, like most other members of the genus, is a handsome and ornamental tree, and various species of *Oreopanax* often are planted for ornament in the temperate region. They often begin growth as epiphytes, becoming later terrestrial when the host tree dies.

Oreopanax Donnell-Smithii Standl. Journ. Wash. Acad. Sci. 17: 315. 1927. Atirro, Prov. Cartago, 600 meters, *J. D. Smith 6533*. Collected also at Tucurrique, Orosi, and lower Río Turrialba. Endemic. A tree, the young branches densely stellate-tomentose; leaves long-petiolate, the blades cordate-suborbicular or rounded-ovate, 19–24 cm. long, rounded or very obtuse at the apex, broadly rounded and shallowly cordate at the base, entire, glabrous; flower heads very numerous, in large, pyramidal panicles.

Oreopanax Liebmanni March. *Cacho de venado, Matapalo.* Frequent in forests at middle elevations; region of San Ramón; ascending to 2,000 meters or more, and descending to about 1,000 meters. Panama to southern Mexico. A tree of 5–7 meters, the trunk 20 cm. in diameter, the bark dark brown, glabrous or nearly so outside the inflorescence, there stellate-pubescent; leaves on long or short petioles, mostly oblong-oblanceolate, sometimes very narrow, acuminate, more or less attenuate to the acute base, entire, sometimes stellate-pubescent beneath; flower heads small, in elongate, panicled racemes; fruit cream-colored. Some of the Costa Rican material has been referred to *O. oligocarpum* Donn. Smith, of Guatemala.

Oreopanax nubigenum Standl. Journ. Wash. Acad. Sci. 17: 315. 1927. Wet forest at Las Nubes, Prov. San José, 1,800 meters, *Standley 38806*. Slopes of Irazú and Barba; also in the region of San Ramón. Endemic. A tree of 6–10 meters, the branches glabrous or very sparsely stellate-pubescent; leaves on very long petioles, the blades broadly deltoid-rounded, often broader than long, 7.5–15 cm. long, acute or abruptly acute, rarely obtuse, truncate to obtuse or very broadly cuneate at the base, entire, glabrous; flower heads numerous, in panicled racemes.

Oreopanax Oerstedianum March. Bull. Acad. Belg. II. 47: 85. 1879. *Moquillo, Cacho de venado*. Irazú, at 2,400 meters, *Oersted*. Frequent in forests of the central region, chiefly at 1,200–2,400 meters; region of San Ramón. Endemic. A tree of 6–15 meters, often epiphytic, the trunk sometimes 1 meter in diameter, the branches covered with coarse, rusty, stipitate, stellate hairs; leaves on long or short petioles, oblong to oblong-ovate or elliptic-oblong, small or large, shortly narrow-acuminate, acute to rounded at the base, more or less densely stellate-pilose with stipitate hairs on both surfaces; flower heads small, the racemes usually forming rather large panicles, the whole inflorescence densely stellate-pilose.

Oreopanax pycnocarpum Donn. Smith, Bot. Gaz. 31: 113. 1901. *Cacho de venado*. *O. latissimum* Cufodontis, Archivio Bot. 9: 198. 1933 (Volcán Irazú, above Guayabillos, 2,500 meters, *Cufodontis 495*). El Copey, 1,800 meters, *Tonduz 11933*. Forests of the central mountains, chiefly at 1,000–2,000 meters; region of San Ramón. Endemic. A tree of 6–10 meters, finely stellate-pubescent on the younger parts, the crown dense and rounded; leaves long-petiolate, the blades oval, mostly 12–20 cm. long, rounded or very obtuse at the base and apex, entire, triplinerved; inflorescence stellate-pubescent, the racemes short; flowers yellowish white or green.

Oreopanax Standleyi A. C. Smith, Brittonia 2: 259. 1936. *Cacho de venado*. Wet forest near Zurquí, Prov. San José, 2,000–2,500 meters, *Standley & Valerio 48068*. Frequent in forests of the central mountains, at middle or rather high elevations. Endemic. A tree as much as 10 meters high, or often an epiphytic shrub, the young branches densely stellate-tomentose with short-stipitate or almost sessile hairs; leaves long-petiolate, the blades ovate or elliptic, 13–30 cm. long, abruptly short-acuminate, broadly rounded to subcuneate at the base, glabrous or sparsely stellate-pilose above, stellate-tomentose beneath; flower heads numerous, in elongate,

paniculate racemes, forming a usually large panicle. The bark is described as nearly smooth and pale green, with small, buff lenticels; fruit clusters pale yellow to dull reddish violet; petioles and veins of the lower leaf surface dull red.

Oreopanax xalapense (HBK.) Dcne. & Planch. *Mata gente, Higuera. O. Taubertianum* Donn. Smith. *O. xalapense* var. *spiciforme* Kuntze, Rev. Gen. 1: 271. 1891 (type from Costa Rica). Frequent in mountains of the central region, mostly at 1,200–2,700 meters; region of San Ramón. Panama to Mexico. A small or medium-sized tree, almost glabrous but with scant pubescence of close, minute, stellate hairs; leaves long-petiolate, the 5–9 leaflets narrowly oblong to obovate, 8–30 cm. long, entire or somewhat serrate, long-acuminate; flower heads in often greatly elongate, panicled racemes. Easily recognized among Costa Rican species by its digitately compound leaves.

SCIADODENDRON Griseb.

The genus consists of a single species.

Sciadodendron excelsum Griseb. *Chile. Reynoldsia americana* Donn. Smith, Bot. Gaz. 49: 455. 1910 (Nicoya, *Tonduz 13823*). Occasional in forests or on open slopes of the Pacific tierra caliente; Guanacaste. Ranging to Colombia and Salvador. A medium-sized, deciduous tree, usually leafless during the dry season, with few thick branches, the bark smooth and pale; leaves very large, often a meter long, two or more times pinnate-ternate, the numerous small leaflets ovate, serrate, glabrous; flowers umbellate, the umbels racemose. The plant sometimes flowers when merely a shrub. In Panama, where the tree is called Jobo de lagarto, the petioles are employed for making bird cages.

SCIODAPHYLLUM P. Br.

Trees or shrubs, glabrous or with close, appressed pubescence; leaves digitately compound, the leaflets entire; flowers capitate or umbellate, in simple or panicled racemes; calyx truncate or repand-dentate; petals normally 5, valvate, connate and deciduous as a cap; ovary 3–5-celled, the styles distinct; fruit subglobose, angulate when dried.—At least one other species occurs in Central America. The generic name has often been written *Sciadophyllum.*

Sciodaphyllum robustum A. C. Smith, Brittonia 2: 254. 1936. Near Finca Johanson, Los Angeles de San Ramón, Prov. Alajuela, *Brenes 6163.* Known only from the original collection. A tree, the

branches cinereous-puberulent, soon glabrate; leaves long-petiolate, the leaflets 12–15, long-petiolulate, elongate-oblong, 15–30 cm. long, caudate-acuminate, obtuse or rounded at the base, entire, glabrous; flowers capitate.

Sciodaphyllum systylum Donn. Smith, Bot. Gaz. 31: 113. 1901. *Papayo. Schefflera systyla* Viguier, Ann. Sci. Nat. IX. 9: 363. 1909. El Alto de La Palma, 1,540 meters, *Tonduz 7395*. Occasional in forests of the central mountains, mostly at 900–1,500 meters. Endemic. A shrub or small tree, up to 8 meters or more in height, the branches ferruginous-stellate-pilose, the same pubescence extending to the leaves and inflorescence; leaflets 7–9, elongate-oblong, up to 25 cm. in length, caudate-acuminate; flowers umbellate; pedicels 5–8 mm. long; flowers greenish white; fruits 3–4 mm. long.

UMBELLIFERAE. Carrot Family

Herbs or small shrubs; leaves alternate, compound or sometimes simple, the petioles often dilated at the base; stipules commonly none; flowers small, most often white, yellow, or greenish, generally in simple or compound umbels, sometimes capitate, the umbels and umbellules often involucrate and involucellate; calyx tube adnate to the ovary, its margin truncate or 5-dentate; petals 5, inserted on the margin of the calyx, often emarginate or bilobate; stamens 5, inserted on the epigynous disk, the filaments filiform, the anthers versatile; ovary inferior, 2-celled, the styles 2, filiform, persistent, often borne on a conic or depressed stylopodium, the ovules 1 in each cell; fruit dry, composed of 2 carpels which usually separate at maturity.—A few other genera are known from northern Central America. The family is best represented in temperate regions.

APIUM L.

Annual, biennial, or perennial herbs, the leaves variously divided; umbels usually compound, with or without an involucre, the umbellules usually involucellate, the flowers white or greenish; calyx teeth none or obscure; petals acuminate or acutish; stylopodium depressed or short-conic; fruit ovoid or ovoid-globose, laterally compressed, subdidymous, often broader than long.—No other species are known from Central America.

Apium Ammi (L.) Urban. *Culantrillo, Eneldillo. A. leptophyllum* (Pers.) F. Muell. Frequent in grassy places, most often in pastures, Meseta Central and other regions of similar elevation. Widely distributed in tropical America and in the Old World.

Plants slender, annual, branched, seldom more than 50 cm. high and often much lower; leaves small, slender-petiolate, the blades dissected into numerous linear divisions, glabrous; umbels solitary, opposite the leaves, few-flowered, the pedicels mostly 3–7 mm. long; involucels none; petals white; fruit acutish, 1–3 mm. long.

Apium graveolens L. *Apio. Celery.* This well known plant, native of Eurasia, is rarely planted for its edible petioles. It is seldom grown in Central America.

ARRACACIA Bancr.

Perennial herbs, glabrous or puberulent, sometimes with tuberous roots; leaves pinnate or pinnately decompound, the segments usually broad; umbels compound, the involucre of foliaceous bracts or wanting, the involucels of numerous bractlets; flowers white or greenish; calyx teeth small or obsolete; petals broad, with an inflexed tip; stylopodium conic; fruit ovate or ovate-oblong, usually narrowed at the apex, laterally compressed, the carpels subterete or 5-gonous.—A few other species are found in northern Central America.

Arracacia atropurpurea (Lehm.) Hemsl. Frequent in brushy places in the central region, 1,200–1,800 meters. Panama to southern Mexico. Plants erect, branched, glabrous or nearly so, a meter high or less, the stems usually tinged with red and somewhat glaucous; leaflets simple or deeply lobate, ovate or ovate-oblong, mostly 1.5–4 cm. long, acute or acuminate, closely and finely serrate, more or less glaucous beneath; involucre none; flowers greenish; fruit 5–6 mm. long.

CORIANDRUM L. Coriander

Coriandrum sativum L. *Culantro, Culantro de Castilla.* A native of the Mediterranean region, grown commonly in Costa Rican gardens, as in most other parts of the earth, for its aromatic seeds, used for flavoring food. The flowers are usually tinged with pink.

DAUCUS L.

Annual or biennial herbs, usually hispid, the leaves pinnately decompound, with linear or small segments; umbels compound, the bracts of the involucre usually dissected, sometimes none; involucels trifid, entire, or none; flowers white; calyx teeth evident or obsolete; petals obovate or rounded, inflexed at the tips; stylopodium

depressed or short-conic; carpels of the fruit semiterete, aculeate or setose on the ribs.—No other species are found in Central America.

Daucus Carota L. *Zanahorria. Carrot.* Native of Europe, the carrot is one of the common vegetables of Costa Rican gardens, at least in the temperate regions. It is grown for food in all civilized parts of the earth.

Daucus montanus Humb. & Bonpl. Frequent in grassy places of the Meseta Central; region of Dota; meadows of Volcán de Irazú. Widely distributed in tropical and subtropical regions of America. Plants erect, sparsely or densely hispidulous, rarely more than 60 cm. high and usually even lower; leaves divided into very numerous small, narrow segments; involucre of much divided, leaflike bracts, the bractlets linear; fruit 5 mm. long, with close rows of stiff spines along the ribs.

ERYNGIUM L.

Reference: H. Wolff, Pflanzenreich IV. 228: 106. 1913.

Annual or more often perennial herbs, glabrous; leaves simple or divided, often coriaceous, most often spinose-dentate; flowers white, greenish, or colored, in dense heads or spikes, the outer bracts forming an involucre about the head or spike; calyx teeth conspicuous, rigid; petals erect, more or less emarginate; fruit ovoid or obovoid, usually more or less squamose.—Other species occur in northern Central America.

Eryngium affine Wolff, Repert. Sp. Nov. 7: 345. 1909. Meadows near San José, *Polakowsky 25*. Known only from the original collection. Very similar to *E. Carlinae*, but the bracts entire, not dentate. I have seen a photograph of the type of this species, in the Berlin herbarium, and I suspect that it is nothing more than a form or variety of *E. Carlinae*.

Eryngium Carlinae Delar. *Achicoria, Chicoria, Culantro cimarrón.* Frequent in meadows and grassy places of the Meseta Central and many other regions of similar elevation; region of San Ramón. Extending to Mexico. Plants perennial, erect or ascending, sparsely branched, rarely more than 30 cm. high; basal leaves forming a rosette, oblanceolate or obovate, obtuse or rounded at the apex, coarsely spinulose-serrate or lobate; heads ovoid or short-cylindric, comose, the bracts 8–10, rigid, bluish, broadly lanceolate or oblanceolate, 10–15 mm. long, spinulose-serrate. A rather handsome plant,

common in meadows about San José and Cartago. An infusion of the herb is employed for treating digestive disturbances in children.

Eryngium costaricense Wolff, Repert. Sp. Nov. 7: 278. 1909. Volcán de Turrialba, 2,600 meters, *J. D. Smith 7528*. I presume that a plant that I collected in the paramos of Cerro de Las Vueltas, at 3,000 meters, and once determined as *E. scaposum* Turcz., is referable to this species, but I have no specimen of the Las Vueltas collection at hand. Endemic. Stems low, simple; leaves ovate-oblong or oblanceolate, obtuse, crenate-serrate, the teeth obtuse, not spine-tipped; bracts 8–10, obovate-oblong, obtuse, few-serrate near the apex, 6–8 mm. long, bluish. The plant of Cerro de Las Vueltas is a characteristic and rather conspicuous paramo species. It is called Achicoria.

Eryngium foetidum L. *Culantro, Culantro coyote.* Frequent in the tierra caliente and at higher elevations, growing mostly in waste ground, especially about dwellings; often planted in gardens in places where it does not grow naturally. Widely distributed as a weed in tropical America. Plants perennial, prostrate or ascending; basal leaves usually forming a rosette, oblanceolate, 25 cm. long or less, obtuse, crenate; flower heads cylindric, 2 cm. long or less, green; bracts 5–6, green, acute, entire or spinulose-serrate. A common and well known plant in many parts of Central America. All parts, especially the roots, have a strong and extremely offensive odor. Strangely enough, however, when cooked in soups or meat dishes, they impart to them an exceptionally agreeable flavor, and the leaves are used generally for this purpose.

FALCARIA Bernh.

Falcaria sioides (Wib.) Aschers. *Flor de amor.* Naturalized along roadsides about Tres Ríos; sometimes cultivated about San José as an ornamental plant. Native of Europe and Asia. A coarse, biennial or perennial herb, often a meter high, glabrous; lowest basal leaves ovate-lanceolate, the upper ones ternate or ternatisect, the segments narrowly linear-lanceolate, 20 cm. long or less, spinulose-serrate; umbels involucrate, the flowers white; fruit linear-oblong, 4–5 mm. long.

FOENICULUM Mill. Fennel

Foeniculum vulgare Mill. *Eneldo.* Cultivated commonly in gardens, for use in flavoring food; sometimes escaping to roadsides, as at Tres Ríos and elsewhere. Native of Europe and Asia. An

erect, glabrous annual, the leaves divided into very numerous filiform segments; flowers white or greenish, the large umbels not involucrate; fruit dorsally compressed, 3 mm. long.

HYDROCOTYLE L.

Reference: Rose & Standley, The Central American species of *Hydrocotyle*, Journ. Wash. Acad. Sci. 17: 194. 1927.

Small, usually creeping perennials, glabrous or pubescent; leaves long-petiolate, often peltate, entire or parted; flowers white or yellow, mostly in simple or proliferous umbels; involucre none or sometimes present; stylopodium depressed or conic; fruit transversely ovate to orbicular, laterally compressed.—No other species is known from Central America.

Hydrocotyle bonariensis Lam. *Comalillo, Sombrerillo.* San José and San Ramón, 900–1,200 meters, in wet soil. Generally distributed in the warmer parts of America. Plants glabrous, creeping; leaves orbicular or nearly so, peltate, shallowly lobed or crenate; umbels many-flowered, proliferous, the flowers long-pedicellate.

Hydrocotyle leucocephala Cham. & Schlecht. *H. Maxonii* Rose in Rose & Standl. Journ. Wash. Acad. Sci. 17: 197. 1927 (stony, wet roadside near La Palma de San José, 1,300–1,700 meters, *Maxon & Harvey 8047*). Frequent in meadows and other grassy or open places, chiefly in the central mountains at 1,500–2,400 meters, but found also at Guápiles and Tuis, in the Atlantic tierra caliente; region of San Ramón. Mexico to Bolivia and Brazil. Leaves rounded-reniform, not peltate, glabrous or sparsely pilose, crenate, the petioles pilose with reflexed or spreading hairs; umbels simple, the pedicels short, only 1–3 mm. long, the peduncles pilose; flowers white; fruit 1 mm. long.

Hydrocotyle mexicana Cham. & Schlecht. Common in moist places in forests of the central mountains, or in pastures, chiefly at 1,200–2,400 meters, but also in the upper part of the Atlantic tierra caliente; Guanacaste; region of San Ramón. Mexico to Ecuador. Stems glabrous or hirsutulous; leaves orbicular-reniform, not peltate, sparsely or densely strigose on the nerves, shallowly 7–11-lobate, the petioles hirsute; umbels simple, the pedicels mostly 3–7 mm. long, the peduncles densely puberulent; fruit 1–1.5 mm. long.

Hydrocotyle pusilla A. Rich. *H. costaricensis* Rose in Rose & Standl. Journ. Wash. Acad. Sci. 17: 195. 1927 (roadside bank near

La Palma de San José, 1,500–1,700 meters, *Maxon 7902*). Mountains of the central region, also about San José, at 1,100–1,800 meters; region of Dota. Mexico to West Indies and Uruguay. Leaves orbicular-peltate, 3–20 mm. wide, glabrous beneath, glabrous or sparsely villous above, shallowly 5–8-lobate, the petioles villous; umbels simple, the flowers sessile or subsessile; fruit 0.5 mm. long, glabrous or sparsely hirsute.

Hydrocotyle ranunculoides L. f. Growing in shallow water, region of San José; Atlantic tierra caliente. Generally distributed in the warmer parts of America. Plants glabrous; leaves not peltate, rounded-reniform, somewhat succulent, 5–6-lobate, the lobes crenate or lobulate; umbels simple, 5–10-flowered, the pedicels 1–3 mm. long; fruit 1–3 mm. long. The plant is often floating in shallow water, at other times prostrate on mud or wet soil.

Hydrocotyle ribifolia Rose & Standl. Journ. Wash. Acad. Sci. 17: 196. 1927. Moist forest on Cerro de Las Vueltas, Prov. San José, 3,000 meters, *Standley & Valerio 43506*. Endemic and known only from the type region. Plants relatively large and coarse, the stems as much as a meter long, villous with long, spreading hairs; leaf blades pentagonal, 5–9 cm. wide, deeply cordate at the base, 5-lobate to about the middle, the lobes broadly ovate, acute or acutish, rather densely villous on both surfaces; umbels simple, the pedicels 2.5–4 mm. long; fruit 1.5 mm. long.

Hydrocotyle Torresiana Rose & Standl. Journ. Wash. Acad. Sci. 17: 196. 1927. Potrero on the southern slope of Volcán de Turrialba, near the Finca del Volcán de Turrialba, 2,400 meters, *Standley 34950*. Endemic, and known only from the region of the type. Plants small and slender, creeping, the stems sparsely villous; leaves not peltate, reniform-orbicular, 1–2.5 cm. wide, very shallowly 5-lobate, short-villous on both surfaces; flowers sessile in small heads, purplish, numerous; fruit 1 mm. long, glabrous.

Hydrocotyle umbellata L. *Sombrerito*. Occasional in wet soil or at the edge of water in the Meseta Central, 1,100–1,300 meters. Generally distributed in temperate and tropical America. Plants glabrous; leaves orbicular-peltate, crenate or crenate-lobate; umbels simple, many-flowered; pedicels 2–2.5 mm. long; fruit 1–2 mm. long.

MYRRHIDENDRON Coult. & Rose

Plants large and shrubby, glabrous, the leaves large and decompound, the petioles much broadened and sheathing at the base;

flowers white, in large, compound umbels, the umbels involucrate, the umbellules involucellate; calyx teeth obsolete; fruit linear or oblong, dorsally compressed, the ribs not winged; stylopodium short-conic.—One other Central American species has been described from the mountains of Panama.

Myrrhidendron Donnell-Smithii Coult. & Rose, Bot. Gaz. 19: 466. *pl. 32.* 1894. *Arrecachillo.* Upper slopes, Volcán Irazú, *J. D. Smith 4825.* Occasional in open ravines on the upper slopes of Irazú, Turrialba, Barba, and Poás; Cerro de Las Vueltas; at 2,500–3,000 meters. Endemic. A stout, glabrous herb or shrub, as much as 4.5 meters high, the stems thick and hollow, sparsely branched; leaves large, the leaflets numerous, ovate or lanceolate, mostly 2.5–5 cm. long, acute, acutely serrate, paler beneath; flowers white or greenish; bracts and bractlets parted or lobate, the pedicels and rays of the umbels more or less viscid-pubescent; fruit 10–12 mm. long, dark purple. Probably the largest member of its family in North America, this plant is striking in appearance, and rather handsome. In some places, as on the upper slopes of Turrialba, it is abundant. Not infrequently it grows as an epiphyte upon the low trees.

OSMORRHIZA Raf.

Pubescent, erect perennials with fleshy, fasciculate roots; leaves thin and soft, decompound; flowers white, in compound, few-rayed umbels; involucre and involucels of few narrow bracts or none; calyx teeth obsolete; stylopodium conic; fruit linear or oblong-linear, short-beaked, more or less setose along the low ribs, narrowed at the base, the carpels 5-angular.—No other species are known from Central America.

Osmorrhiza mexicana Griseb. In forest in the higher mountains, 2,800–3,000 meters. Extending to Mexico. Plants slender, a meter high or less, sparsely pilose; leaves large, bright green, the segments deeply lobate and dentate; fruit linear, 1–1.5 cm. long, rather densely setose-strigose. The plant often forms large colonies in rather open places in the high forest.

SANICULA L.

Perennial or biennial, usually glabrous herbs, erect; leaves palmately compound; flowers very small, in compound, usually few-rayed umbels, the umbellules globose; bracts foliaceous, the bractlets small; calyx lobes membranous; disk flat; fruit somewhat

compressed laterally, subglobose, covered with uncinate bristles.—No other species are known from Central America.

Sanicula mexicana DC. Frequent in forest or brushy places of the central mountains, mostly at 1,100–2,500 meters; region of San Ramón. Mexico to Bolivia. Plants commonly 50 cm. high or less, glabrous; leaves angled, parted, the segments lobate and crenate-serrate; flowers greenish, sessile in the small heads; fruits covered with yellowish bristles. The fruits attach themselves freely to clothing by means of their hooked bristles.

SPANANTHE Jacq.

Dichotomously branching herbs, probably annual, glabrous or nearly so; leaves chiefly opposite, petiolate, the stipules scarious, lacerate, the petioles setose at the apex; umbels simple, axillary; involucre of small, linear, entire bracts; flowers white; calyx teeth rather conspicuous; stylopodium depressed-conic; fruit dorsally compressed, ovoid, the ribs slender, not winged.—The genus consists of a single species.

Spananthe paniculata Jacq. Occasional as a weed in waste ground in the Meseta Central, and at various localities on the Pacific slope; probably in the tierra caliente of both coasts. Widely distributed in tropical America. Plants usually much branched, a meter high or less; leaves thin, ovate or broadly deltoid, acute or acuminate, crenate or dentate; pedicels long and slender; fruit 2.5 mm. long. In Central America the plant grows usually as a weed in waste places, but it is seldom plentiful.

PETROSELINUM Hoffm. Parsley

Petroselinum hortense Hoffm. *Perejil.* A plant of European origin, grown occasionally in Costa Rican gardens for its leaves, which are employed for flavoring and garnishing food.

CORNACEAE. Dogwood Family

In Central America the family is represented by a single genus and species.

CORNUS L.

Shrubs or trees; leave opposite, entire; stipules none; flowers small, white or greenish, in cymes or heads, the heads sometimes surrounded by large, white bracts; calyx tube adnate to the ovary, turbinate or campanulate, the limb minutely 4-dentate; petals 4,

valvate; stamens 4, inserted with the petals; ovary 2-celled, the stigma truncate or capitate, the style short or elongate, the ovules 1 in each cell; fruit drupaceous, the stone 2-celled and 2-seeded.

Cornus disciflora DC. Occasional in mountain forests at middle or rather high elevations; known from El Copey, La Carpintera, and slopes of Poás. Ranging to Mexico. A shrub or small tree, about 4.5 meters high; leaves lance-oblong, long-acuminate, acute at the base, conspicuously nerved, pale beneath and minutely sericeous; flowers small and greenish, in dense, globose, long-pedunculate, solitary heads.

GARRYACEAE

Reference: Wangerin, Pflanzenreich IV. 56a. 1910.

The family consists of a single genus, which has most often been referred to the Cornaceae. Wangerin would place the Garryaceae among the Amentales, in association with the Betulaceae, Salicaceae, etc. The present writer has preferred to leave the group in its conventional historical position, where it is most likely to be sought.

GARRYA Dougl.

Shrubs or small trees; leaves opposite, petiolate, entire or nearly so, penninerved, persistent, coriaceous, the petioles connate at the base; flowers small, dioecious, in pendulous, ament-like racemes, the staminate long-pedicellate, the pistillate sessile or short-pedicellate, the racemes mostly axillary, with opposite bracts, the flowers solitary or ternate in the axils of the bracts; staminate flower with 4 valvate sepals, the 4 stamens with free filaments and basifixed anthers; pistillate flowers without sepals, the ovary 1-celled, the styles 2, subulate; ovules 2; fruit baccate, 1–2-seeded.—A single species is found in Central America.

Garrya laurifolia Hartweg. *Comenegro.* In open forest on the upper slopes of Irazú, Turrialba, and Cerro de Las Vueltas; mostly at 2,700–3,000 meters. Guatemala and Mexico. A shrub or tree, sometimes 12 meters high, with dense crown, the branches at first cinereous-tomentellous, soon glabrate; leaves lance-elliptic or oblong, 6–15 cm. long, obtuse, narrowed at the base, leathery, at first more or less tomentulose but soon glabrate; fruits globose or ovoid, glabrous, somewhat juicy, about 7 mm. in diameter. The tree is common in the potreros of Turrialba, where it is a characteristic species. The Costa Rican localities are far from the ordinary range

of the species, and one would expect the tree to be specifically distinct, but I am unable to discover any characters upon which to base a separate species.

CLETHRACEAE

Reference: Britton, N. Amer. Fl. 29: 3–9. 1914.

The only other genus of the family (*Schizocardia*) is confined, so far as known, to British Honduras.

CLETHRA L.

Shrubs or trees; leaves alternate, petiolate, simple, often dentate, penninerved; flowers perfect, in terminal, elongate, simple or branched racemes; calyx deeply 5-cleft, the segments imbricate, persistent; corolla white or pink, the 5 petals distinct or nearly so, imbricate; stamens 10, the filaments slender, short or elongate, the anthers sagittate, opening by apical pores; ovary superior, pubescent, 3-lobate, 3-celled, the style 1, compound, the stigmas 3-lobate, the ovules numerous; fruit capsular, loculicidally 3-valvate, 3-lobate.—A few additional species are known from Central America.

Clethra costaricensis Britton, N. Amer. Fl. 29: 5. 1914. Savannas of Cañas Gordas, 1,100 meters, *Pittier 11115*. Branches densely villous with long, brown hairs; leaves obovate or elliptic-obovate, 10–17 cm. long, chartaceous, remotely undulate-dentate or entire, obtuse or acutish, narrowed to the obtuse base, loosely pubescent or glabrate above, paler beneath and densely villous; racemes densely brown-villous, 12–20 cm. long, the pedicels 3–5 mm. long; calyx tomentose, 4 mm. long. I have seen no material of this species, which I suspect, from the description, is synonymous with *C. lanata*.

Clethra gelida Standl., sp. nov.—Frutex 1.5–3.5 m. altus dense ramosus, ramulis ochraceis densissime minute adpresso-lepidotis, internodiis brevibus; folia parva breviter petiolata crasse coriacea, petiolo crasso 5–8 mm. longo dense adpresso-lepidoto; lamina ovalis usque late oblonga 2–5.5 cm. longa 1–3 cm. lata, apice rotundata vel obtusissima, basi obtusa, integerrima, supra glabra, costa ut nervis profunde impressa, subtus brunneo-ochracea, ubique densissime minute adpresso-lepidota, costa crassa elevata, nervis lateralibus utroque latere ca. 10 prominulis angulo lato divergentibus, venulis obsoletis; racemi axillares et solitarii vel apicales atque subpaniculati, pedunculati, plerumque 1–2.5 cm. longi, subdense pauciflori, rhachi crassa dense velutine brunneo-

stellato-pilosa, pedicellis crassis vix ultra 1 mm. longis, bracteis lanceolato-linearibus ad 4 mm. longis dense stellato-tomentulosis; alabastra ovoideo-globosa fere 3 mm. longa dense brunneo-stellato-tomentulosa; sepala imbricata late ovata obtusa; petala orbicularia glabra.—Open forest, Cerro de Las Vueltas, Prov. San José, 2,700–3,000 meters, frequent, *Standley & Valerio 43971* (type in U. S. Nat. Herb.; fragment in Herb. Field Mus.). The species is altogether unlike any other known from North America, its relationship being evidently with certain species of the high Andes of western South America.

Clethra lanata Mart. & Gal. *Nance macho, Nance.* Frequent in forests of the central mountains, chiefly at 1,200–1,900 meters, ascending to 2,400 meters; regions of Dota and San Ramón; also in the Pacific tierra caliente, at Boruca and Buenos Aires. Panama to southern Mexico. A shrub or tree, sometimes 12 meters high, the trunk as much as 1 meter in diameter, the crown spreading; bark dark brown, deeply sulcate; young branches and petioles densely brown-tomentose; leaves obovate, more or less coriaceous, rounded or acute at the apex, narrowed at the base, entire or somewhat dentate, glabrate above, densely brownish-tomentose beneath; racemes dense, mostly 10–15 cm. long, the pedicels 1.5–3.5 mm. long; calyx 3–3.5 mm. long; capsule puberulent, 4 mm. wide.

MONOTROPACEAE. Indian Pipe Family

The family is represented in Central America by a single genus.

MONOTROPA L. Indian Pipe

Monotropa coccinea Zucc. Occasional in dense forest of the central region, especially about Cartago and Santa María de Dota, at 1,500–2,200 meters. Mexico to Colombia. A glabrous saprophyte, fleshy, about 30 cm. high, red in all its parts, the stems simple, terminated by a single flower; leaves represented by scales; flowers 1.5–2 cm. long, with 5 or 6 petals; stamens 10 or 12; fruit capsular, globose, 5–6-celled. The plant is found in the darkest places in mountain forests, growing among decaying leaves.

PYROLACEAE. Shinleaf Family

A single genus of the family is represented in Central America.

CHIMAPHILA Pursh

Another Central American species is reported from Guatemala and Honduras.

Chimaphila guatemalensis Rydb. Frequent in dense forests of the region of Dota, at 1,600–3,300 meters. Extending to Guatemala. Plants suffrutescent, simple, 15–30 cm. high, glabrous; leaves more or less verticillate, short-petiolate, lanceolate, 6–10 cm. long, acute, serrate, coriaceous, green; flowers few, terminal, subumbellate; sepals 5; petals 5, fleshy, white, 8 mm. long; capsule 5-celled, depressed.

ERICACEAE. Heath Family

Reference: Albert C. Smith, The American species of Thibaudieae, Contr. U. S. Nat. Herb. 28: 311. 1932.

Shrubs or small trees, often epiphytic; leaves alternate, simple, entire or dentate; stipules none; flowers perfect, symmetric or nearly so, the calyx deciduous or persistent; corolla hypogynous or epigynous, nearly always gamopetalous, the lobes contorted or imbricate; stamens normally twice as many as the corolla lobes, epigynous or hypogynous, the filaments free or somewhat connate, the anthers 2-celled, often caudate, opening by pores; ovary superior or inferior, 4–10-celled, the ovules numerous, on axile placentas; fruit baccate or drupaceous.—Several other genera of the family are represented in Panama and in northern Central America.

ARCTOSTAPHYLOS Adans.

Shrubs or trees, terrestrial, the leaves alternate, coriaceous, entire or dentate; flowers small, in terminal, racemiform panicles; corolla urceolate; stamens 10, included, the filaments short; fruit drupaceous, the 5 small nutlets united.—Other species occur in Central America.

Arctostaphylos arbutoides (Lindl.) Hemsl. Frequent in oak forests (*encinales*) in the region of Dota; Páramos del Abejonal; at 1,500–1,800 meters. Guatemala; Panama. A shrub of 2–3.5 meters; leaves oblong, 5–10 cm. long, obtuse, glabrous above, covered with a dense, brownish tomentum beneath, entire; corolla 6–7 mm. long, greenish white; ovary pubescent; drupes 4–5 mm. in diameter. A characteristic shrub of the open oak forests in the region of Santa María de Dota, growing in well drained and exposed places. The Costa Rican plant has been confused with *A. oaxacana* DC., a Mexican species.

Arctostaphylos rubescens (Bertol.) Hemsl. *Comarostaphylis costaricensis* Small, N. Amer. Fl. 29: 89. 1914 (Irazú, *Kuntze 2361*). Upper slopes of Volcán de Irazú. Guatemala. A shrub, the branches

glabrous; leaves short-petiolate, narrowly oblong to narrowly elliptic, 3–7 cm. long, acute or short-acuminate, entire, glabrous, pale beneath, the margins somewhat revolute; corolla 6–7 mm. long; ovary glabrous; fruits 4–5 mm. in diameter.

CAVENDISHIA Lindl.

Shrubs, usually epiphytic, the leaves coriaceous, petiolate; flowers fasciculate or racemose, terminal or axillary, the inflorescence bracteate at the base and when young usually enclosed by the large, reddish bracts, the pedicels with 2 deciduous bractlets; calyx tube articulate with the pedicel, short-cylindric or campanulate, the limb 5-lobate; corolla subcylindric, 5-lobate; stamens alternately unequal, the filaments distinct or coherent at the base, attached to the anther dorsally near its base; tubules of the anthers somewhat longer than the sacs, opening by elongate, introrse clefts; style filiform, about equaling the corolla, often exserted.—A few other species are found in Central America. The large, rather hard, juicy fruits have a somewhat acid flavor, and are most agreeable to eat. This genus includes some of the most beautiful and showy of all Costa Rican plants. Their foliage is handsome, and the rather ample inflorescences are often colored in exquisite shades of pink and red. The plants are exceedingly abundant in many regions, usually at fairly high elevations, where they often form a large percentage of the epiphytic vegetation.

Cavendishia bullata A. C. Smith & Standl. Contr. U. S. Nat. Herb. 28: 453. 1932. *Colmillo de perro.* Naranjo, 1,700 meters, *Stork 1789.* Also at El Muñeco, on Río Navarro. Endemic. Branches and petioles pubescent; leaf blades oblong-lanceolate, strongly bullate, 15–28 cm. long, caudate-acuminate, abruptly truncate at the base, 5–7-plinerved, glabrous above, setose beneath on the nerves; inflorescence many-flowered, large and dense, subtended by large, showy bracts; calyx limb erect, 5 mm. long; corolla 26–28 mm. long, densely pubescent. Noteworthy for the narrow, elongate, strongly bullate leaves.

Cavendishia capitulata Donn. Smith, Bot. Gaz. 25: 147. 1898. La Palma, Prov. San José, 1,500 meters, *Wercklé 11565.* Frequent in the mountains of the central region, chiefly at 1,500–1,800 meters; Guanacaste, at elevations as low as 600 meters; region of San Ramón. Endemic. A small shrub, the branches glabrous; leaves very shortly petiolate, ovate-oblong to narrowly oblanceolate-oblong, 2–5 cm. long, rounded or obtuse at the apex, narrowed to the base, glabrous,

obscurely 5-plinerved; inflorescences few-flowered, glabrous; calyx limb suberect, 2–3 mm. long; corolla dark purple or rose-red, 11–15 mm. long. Noteworthy for the small, narrow, very coriaceous leaves, with obscure venation. The leaves are unusually variable in size, the specimens from San Ramón having, for the most part, substantially larger leaves than those from other regions.

Cavendishia complectens Hemsl. Biol. Centr. Amer. Bot. 2: 272. 1881. *Chupalon complectens* Kuntze, Rev. Gen. 2: 383. 1891. Type *Endres 257*, without definite locality. Frequent in the central mountains, 1,200–2,000 meters; region of San Ramón. Also Colombia and Ecuador. Easily recognized among Costa Rican species by the leaves, which are ovate to rounded, 10–16 cm. long, and deeply cordate and amplexicaul at the base.

Cavendishia costaricensis Hoerold, Bot. Jahrb. 42: 326. 1909. *Colmillos* (flowers). Common in mountains of the central region, 1,500–2,500 meters; region of San Ramón; Cantón de Dota. Endemic. A small or large shrub, the branches puberulent or glabrate; leaves oblong or ovate-oblong, short-petiolate, 8–14 cm. long, long-acuminate, cuneate at the base, 5–7-plinerved, glabrous or nearly so; inflorescences 8–12-flowered, the bracts rose-pink; calyx limb 3 mm. long; corolla pink, with a white tip, 19–24 mm. long.

Cavendishia Endresii Hemsl. Biol. Centr. Amer. Bot. 2: 273. 1881. *Chupalon Endresii* Kuntze, Rev. Gen. 2: 383. 1891. *Cavendishia glutinosa* Hoerold, Bot. Jahrb. 42: 321. 1909 (La Palma de San José, *Wercklé 19*). Type *Endres 173*, without definite locality. Region of La Palma and La Hondura, at 1,300–2,000 meters. Also in Panamá. A small and rather slender shrub, the branches glabrous; leaves on petioles 4–8 mm. long, ovate-oblong to lance-oblong, 5–8.5 cm. long, long-acuminate, cuneate at the base, glabrous, obscurely pinnate-nerved; inflorescence 3–6-flowered; calyx limb erect, 2 mm. long; corolla 15–17 mm. long, glabrous.

Cavendishia Hoffmannii Hoerold, Bot. Jahrb. 42: 328. 1909. Volcán de Irazú, *Hoffmann 141*. Known only from the original collection. Branches glabrous; petioles 4–7 mm. long, the leaf blades oblong, 10–15 cm. long, long-acuminate, broadly cuneate at the base, glabrous, 5-plinerved, distinctly punctate on both surfaces; inflorescences glabrous, 8–12-flowered; calyx limb 2 mm. long; corolla 20 mm. long.

Cavendishia longiflora Donn. Smith, Bot. Gaz. 37: 420. 1904. Alto de La Palma, Prov. San José, 1,700 meters, *Tonduz 7391*.

Known only from the region of the type locality, 1,300–1,700 meters. Branches pubescent; leaves short-petiolate, the blades thick-coriaceous, broadly oblong, 10–23 cm. long, caudate-acuminate, truncate or subcordate at the base, glabrous above, pilose beneath, conspicuously bullate, 7–9-plinerved; inflorescence 15–25-flowered; calyx limb erect, 4 mm. long, glabrous; corolla 26–30 mm. long, densely pubescent.

Cavendishia melastomoides (Klotzsch) Hemsl. Biol. Centr. Amer. Bot. 2: 273. 1881. *Socratesia melastomoides* Klotzsch, Linnaea 24: 23. 1851. *C. Klotzschiana* Niedenzu, Bot. Jahrb. 11: 206. 1890. *C. Graebneriana* Hoerold, Bot. Jahrb. 42: 324. 1909 (type, *Wercklé 29*). *Chupalon melastomoides* Kuntze, Rev. Gen. 2: 383. 1891. Type collected in Costa Rica by Warscewicz. Occasional in mountains of the central region, 1,500–1,800 meters; region of San Ramón, at 1,150 meters. Endemic. A small, stiff shrub, the branches glabrous; leaves on petioles 4–6 mm. long, the blades oblong or ovate-oblong, 4.5–8 cm. long, long-acuminate, cuneate at the base, glabrous or beneath sparsely pilose, 3–5-plinerved; stiff and coriaceous; inflorescences small and few-flowered; calyx limb erect, 4.5–5 mm. long; corolla purple and white, 28–40 mm. long, glabrous but viscid.

Cavendishia pterocarpa (Donn. Smith) A. C. Smith, Contr. U. S. Nat. Herb. 28: 449. 1932. *Themistoclesia pterocarpa* Donn. Smith, Bot. Gaz. 44: 113. 1907. Cerro de Las Caricias, 2,000 meters, *Pittier 14031*. Slopes of the central mountains, at 2,000–2,400 meters. Endemic. A small, densely branched shrub, the branches minutely puberulent or glabrous; leaves short-petiolate, obovate, 1.5–2 cm. long, rounded at the apex, attenuate to the base, sparsely puberulent when young but soon glabrate, obscurely pinnate-nerved; inflorescences only 1–2-flowered; calyx limb suberect, 2 mm. long; corolla bright, dark red, 20–22 mm. long, glabrous or when young minutely puberulent. Well marked by the small, glabrous, obovate leaves, rounded at the apex.

Cavendishia quercina A. C. Smith, Contr. U. S. Nat. Herb. 28: 450. 1932. Summit of Cerro de Las Caricias, 1,900 meters, *Pittier 14030*. Frequent in mountains of the central region, 1,600–2,500 meters; region of San Ramón, at 1,050 meters or more. Endemic. A stout shrub, the branches at first puberulent; leaves sessile or nearly so, thick-coriaceous, oblong or ovate-oblong, 4–7 cm. long, rounded or very obtuse at the apex, narrowly cordate or

subcordate at the base, 5–7-plinerved, glabrous or nearly so; inflorescences 8–25-flowered; calyx limb erect, 4–5 mm. long; corolla 15–18 mm. long, puberulent.

Cavendishia Quereme (HBK.) Benth. & Hook. Frequent in mountains of the central region, 1,000–1,800 meters; region of San Ramón. Also in Colombia. A rather small shrub, the branches glabrous; leaves short-petiolate, oblong-ovate, 6–12 cm. long, caudate-acuminate, cuneate at the base, 5-plinerved, glabrous; inflorescence glabrous or nearly so, 10–20-flowered; calyx limb suberect, 2–2.5 mm. long; corolla 9–10 mm. long, light yellow, tipped with white; bracts amaranth purple.

Cavendishia Smithii Hoerold, Bot. Jahrb. 42: 328. 1909. Volcán de Irazú, 2,500 meters, *J. D. Smith 4876*. Frequent in the central mountains, 1,400–2,500 meters; Cantón de Dota; region of San Ramón, at 1,200 meters or more. Panama to Nicaragua. A large shrub, the branches glabrous; leaves on petioles 4–10 mm. long, oblong to oblong-obovate, coriaceous, 6–15 cm. long, caudate-acuminate, cuneate to truncate at the base, usually 5-plinerved, glabrous; inflorescence 6–15-flowered; calyx limb 3 mm. long, sparsely pilose; corolla 18–20 mm. long.

Cavendishia veraguensis (Klotzsch) Hemsl. Biol. Centr. Amer. Bot. 2: 273. 1881. *Proclesia veraguensis* Klotzsch, Linnaea 24: 35. 1851. *Chupalon veraguense* Kuntze, Rev. Gen. 2: 383. 1891. Type collected by Warscewicz, without definite locality. Occasional in the central mountains, at 1,100–2,800 meters; region of San Ramón. Endemic. Branches pilose at first, soon glabrate; leaves short-petiolate, oblong or lance-oblong, 9–14 cm. long, long-acuminate, cuneate or truncate at the base, 5-plinerved, glabrous or beneath sparsely puberulent on the nerves; inflorescence 5–12-flowered; calyx limb 1–2 mm. long; corolla 17–19 mm. long, glabrous or about the apex minutely puberulent.

Cavendishia Wercklei Hoerold, Bot. Jahrb. 42: 325. 1909. La Palma, Prov. San José, 1,700 meters, *Wercklé 53*. Known in Costa Rica only from the region of La Palma. Also in Chiriquí, Panama. Branches glabrous; leaves on petioles 5–8 mm. long, oblong or ovate-oblong, 9–13 cm. long, caudate-acuminate, truncate or subcuneate at the base, 5–7-plinerved, glabrous or beneath sparsely pilose; inflorescence 5–12-flowered, glabrous; calyx limb erect, 6 mm. long; corolla 28–29 mm. long.

DISTERIGMA Niedenzu

A single species is known from Central America.

Disterigma Humboldtii (Klotzsch) Niedenzu. *Vaccinium pachyphyllum* Hemsl. Biol. Centr. Amer. Bot. 2: 275. 1881. *D. pachyphyllum* Blake, Journ. Wash. Acad. Sci. 16: 365. 1926. Type of *V. pachyphyllum* collected in Costa Rica, *Endres 154*. Frequent in mountains of the central region, at 1,600–2,400 meters; region of San Ramón, at 1,000 meters or more. Also in Colombia and British Guiana. An epiphytic or terrestrial shrub of 30–90 cm., almost glabrous; leaves alternate, dense, ovate, 7–12 mm. long, obtuse or rounded at the apex, entire; flowers solitary or fasciculate (1–3) in the leaf axils, sessile, subtended by 2 ovate bracts; corolla subcylindric, 6–7 mm. long, glabrous, pink; berries white, translucent.

GAULTHERIA L.

Shrubs or small trees, epiphytic or terrestrial, the pubescence often of gland-tipped hairs; leaves alternate, short-petiolate, coriaceous, dentate or almost entire; flowers small, racemose or paniculate; corolla urceolate or campanulate; stamens 10, included; ovary 5-celled; fruit a fleshy capsule.—When herbarium specimens of these plants are partly dried, they often emit a penetrating and characteristic, aromatic odor, slightly suggestive of wintergreen (*Gaultheria procumbens* of the United States). They are handsome and showy plants because of their abundance of white or pink blossoms. Other species occur in Central America.

Gaultheria alpina (Donn. Smith) Sleumer, Notizbl. Bot. Gart. Berlin 13: 207. 1936. *Pernettia ciliaris* var. *alpina* Donn. Smith, Bot. Gaz. 25: 148. 1898. Cerro de La Muerte, 3,100 meters, *Pittier 10543*. Known only from the original collection. Branches densely setose; leaves oblong-lanceolate, subobtuse at the base, setiferous beneath; peduncles equaling the leaves, bracteate throughout their length. This plant, raised to specific rank by Sleumer, is known to me only from the original description, which is brief and gives only the details enumerated here.

Gaultheria barbata Small, N. Amer. Fl. 29: 77. 1914. Volcán de Poás, *Pittier 2051*. Occasional on the slopes of the central volcanoes. Endemic. A small, epiphytic shrub, the young branches pilose, the hairs not glandular; leaves elliptic, 3–6 cm. long, acuminate, acute at the base; corolla pink or red, 6–7 mm. long, pubescent with eglandular hairs. Collections of this species

and of *G. glandulifera* have been referred to *G. nitida* Benth., a Mexican species.

Gaultheria costaricensis (Donn. Smith) Small, N. Amer. Fl. 29: 79. 1914. *G. odorata* var. *costaricensis* Donn. Smith, Bot. Gaz. 20: 292. 1895. Estrella, Prov. Cartago, *Cooper 5841*. Frequent in forests of the central mountains, at 1,500–1,900 meters; region of San Ramón, at 900 meters or more. Endemic. Generally terrestrial, 1–4.5 meters high, the young branches pubescent; bark cinnamon brown; leaves ovate or oval, rounded or obtuse at the base, pale beneath; corolla white or pink, glandular-pubescent; fruit red, turning black; bracts cream yellow.

Gaultheria Donnellii Sleumer, Notizbl. Bot. Gart. Berlin 12: 126. 1934. Laguna de Barba, *Hoffmann 3* (*173*). Frequent in mountain forests of the central region, at 1,500–3,450 meters. Endemic. Branches glabrous; leaves obtuse or rounded at the base; corolla pubescent, the hairs eglandular. Easy to recognize because of the glabrous branches.

Gaultheria glandulifera Small, N. Amer. Fl. 29: 78. 1914. Volcán de Poás, *J. D. Smith 6639*. Forests of Poás and Irazú. Endemic. Young branches pubescent, the hairs glanduliferous; leaves narrow or rounded at the base; corolla pubescent with eglandular hairs.

Gaultheria gracilis Small, N. Amer. Fl. 29: 77. 1914. La Palma, 1,550 meters, *Tonduz 7463*. Abundant in mountain forests throughout the central region, at 1,500–2,500 meters; usually epiphytic, but sometimes growing in sphagnum bogs; region of San Ramón, at 1,200 meters or more. Endemic. A shrub of 1–2.5 meters, or sometimes smaller, branches strigose; leaves elliptic, acute at the base; corolla crimson, pink, or white, the pubescence of fine, eglandular hairs; fruits purple or dark red; bracts creamy white.

Gaultheria odorata Willd. Region of Cartago, and reported from slopes of the central volcanoes, but the species seems to be rare in Costa Rica. Mexico to northern South America. A small, terrestrial shrub, the young branches pubescent, sometimes with gland-tipped hairs; leaves cordate at the base; corolla white or pink, glandular-pubescent.

Gaultheria poasana Sleumer, Notizbl. Bot. Gart. Berlin 12: 127. 1934. Volcán Poás, 2,600 meters, *J. D. Smith 6631*. Young branches glandular-pubescent, later glabrous; leaves obtuse or rounded at base; corolla 5 mm. long, pubescent with eglandular hairs.

Gaultheria setosa Small. Forests of La Palma, 1,500 meters, *Otón Jiménez 939*. Panama. Branches setose; leaves acuminate, acute at the base; corolla glabrous. Easily recognized by the glabrous corolla.

MACLEANIA Hook.

Shrubs, usually epiphytic, the leaves coriaceous, entire; flowers fasciculate or racemose, terminal or axillary, few- or many-flowered, the flowers pedicellate, the pedicels with 2 deciduous bractlets; calyx tube articulate with the pedicel, short-cylindric or campanulate, the limb erect-patent, normally 5-lobate, the lobes triangular, subacute; corolla cylindric or elongate-urceolate, 5-lobate; stamens equal, usually half as long as the corolla, the filaments distinct or connate, attached to the anther dorsally near its base, the anthers stout, the tubules about as long as the sacs, opening by elongate clefts; style filiform, about as long as the corolla or exserted.—A few additional species are known from Central America.

Macleania glabra (Klotzsch) Hoerold. *Colmillos* (the flowers), *Muelas* (fruits). *Psammisia costaricensis* Klotzsch, Linnaea 24: 47. 1851 (type probably from Costa Rica, *Warscewicz*). *M. turrialbana* Donn. Smith, Bot. Gaz. 27: 339. 1899 (Volcán de Turrialba, *Pittier 7546*). *M. costaricensis* Hoerold, Bot. Jahrb. 42: 268. 1909. *M. irazuensis* Blake, Proc. Biol. Soc. Wash. 35: 121. 1922 (Volcán de Irazú, *Popenoe 1017*). Frequent in forest of the central mountains, 1,500–3,300 meters; region of San Ramón, at 950 meters or more. Also in Chiriquí, Panama. A small shrub, sometimes 1.5 meters high, the branches glabrous; bark deep cinnamon; leaves short-petiolate or almost sessile, thick-coriaceous, oblong or ovate-oblong, 4–10 cm. long, obtuse or subacute, cuneate or rounded at the base, pinnate-nerved, glabrous; inflorescences 4–20-flowered, glabrous or nearly so, the pedicels 10–20 mm. long; corolla pink or pale red, 20 mm. long; tubules of the anthers laterally connate or distinct nearly to the base. Young leaves of à beautiful, deep crimson.

Macleania ovata Klotzsch. Forests of the central mountains, occasional, mostly at 1,400–1,500 meters. Panama. Branches glabrous; leaves nearly sessile, thick-coriaceous, oblong or ovate, 2–4.5 cm. long, obtuse, rounded or cordate at the base, 5–7-plinerved, glabrous; inflorescences 4–7-flowered; corolla orange-red, 21–25 mm. long, glabrous, or slightly pubescent near the apex; tubules of the anthers united to form a single tubule.

Macleania racemosa Cufodontis, Archivio Bot. 9: 199. 1933. Volcán Poás, near La Lechería, 2,150 meters, *Cufodontis 717*. Young branches pubescent; petioles 5–8 mm. long, the blades rigid, oblong-lanceolate, 4–6 cm. long, obtuse, rounded or abruptly attenuate at the base, pinnate-nerved, glabrous; inflorescences 10–15-flowered; corolla 22 mm. long, pale purple, whitish at the apex, glabrous; tubules of the anther 2, connate.

PERNETTIA Gaud.

Reference: Sleumer, Notizbl. Bot. Gart. Berlin 12: 626. 1935.

A single species occurs in Central America.

Pernettia coriacea Klotzsch, Linnaea 24: 85. 1851. *Arrayán.* Type collected in Costa Rica by Warscewicz. *P. setigera* Klotzsch, loc. cit. (Costa Rica, *Warscewicz*); *P. congesta* Klotzsch ex Oerst. Amér. Centr. 9. 1863 (Volcán de Irazú, 3,000 meters, *Oersted*); *P. Oerstediana* Klotzsch ex Oerst. loc. cit. (summit of Irazú, *Oersted 8581*). Abundant in meadows and thickets on the upper slopes of the central mountains, generally at an elevation of 2,400–3,300 meters. Also in Panama. A shrub of 1–3 meters, glabrous or with strigose branches; leaves alternate, ovate or oblong, 1–2 cm. long, acute, serrate; flowers small but showy, white or pink, in small, terminal panicles; corolla 5–7 mm. long, urceolate; berries globose, 5–7 mm. long, black. A characteristic shrub of subalpine regions, forming low, dense thickets. The fruits have an agreeable flavor, but Pittier believes that they may be poisonous. Costa Rican collections have been referred to *P. ciliaris* Don, var. *alpina* Don. Specimens from Volcán de Irazú and Cerro de Las Vueltas are referred by Sleumer to *P. prostrata* (Cav.) Sleumer, var. *purpurea* (Don) Sleumer, but the characters upon which these two species are separated do not appear very convincing, and to the writer it seems more in accordance with the probable facts to refer all Costa Rican collections to a single species.

PSAMMISIA Klotzsch

Epiphytic shrubs, the leaves petiolate, coriaceous; inflorescences axillary or terminal, the flowers fasciculate or racemose, pedicellate, the pedicels with 2 deciduous bractlets; calyx tube articulate with the pedicel, short-cylindric or campanulate, the limb erect-patent, commonly 5-lobate, the lobes ovate or triangular, apiculate or subacute; corolla subcylindric, elongate-urceolate, or subglobose, 5-lobate; stamens equal, often almost as long as the corolla, the

filaments distinct or connate, attached to the anther dorsally near its base, the tubules of the anthers about as long as the sacs, distinct, opening by elongate, introrse clefts, the connectives 2-calcarate distally; style filiform, often exserted.—No other species are known from Central America.

Psammisia ramiflora Klotzsch. *Colmillos* (flowers). *P. symphystemona* Donn. Smith, Bot. Gaz. 20: 291. 1895 (Mariposa, Prov. Alajuela, *Cooper 5842*). Frequent in the central mountains, 1,400–2,000 meters; region of San Ramón. Also in Panama. A small or large shrub, sometimes 3 meters long, the branches glabrous; leaves on very short petioles, oblong or ovate-oblong, 8–17 cm. long, caudate-acuminate, cuneate at the base, 5-plinerved, glabrous; inflorescence short-racemose or subfasciculate, the rachis very short, 4–15-flowered, the slender pedicels 8–25 mm. long; calyx tube 3 mm. long, the limb 3.5–4 mm. long; corolla pink or red, 2–3 cm. long. Many of the inflorescences are borne on naked branches, below the leaves. Austin Smith reports that the flowers are fertilized by hummingbirds of the genus *Phaethornis*.

RHODODENDRON L.

Shrubs or trees, glabrous or variously pubescent; leaves thin or coriaceous, often clustered at the tips of the branches, entire; flowers mostly large and showy, in chiefly terminal racemes or corymbs; calyx 5-dentate or of 5 sepals, sometimes cupular or obsolete, persistent; corolla usually funnelform or campanulate, the limb somewhat oblique, normally with 5 lobes or segments, the lobes imbricate; stamens normally 8–10, the anthers dorsifixed, muticous, dehiscent by terminal pores; ovary 5–20-celled; fruit capsular.—A vast genus, especially in Asia, with numerous species also in temperate North America, but none are native south of the United States.

Rhododendron indicum (L.) Sweet. *Azalea indica* L. An ornamental shrub of low stature, common in gardens of the temperate and cold regions. Native of Japan. The large flowers are red or pink and both showy and beautiful.

SATYRIA Klotzsch

Epiphytic shrubs, the leaves coriaceous, petiolate; inflorescence axillary or terminal, racemose or subfasciculate, few–many-flowered, the flowers pedicellate, the pedicels bibracteolate; calyx tube articulate with the pedicel, the limb subpatent, 5-lobate, the lobes ovate

or triangular; corolla subcylindric, 5-lobate; stamens alternately unequal, shorter than the corolla, the filaments connate to form a tube, attached to the anther dorsally near its base, the anthers alternately unequal, the tubules not clearly differentiated from the sacs, opening by broad, lateral clefts; style filiform, about equaling the corolla.—A few additional species occur in Central America.

Satyria elongata A. C. Smith. Tucurrique and Pejivalle, at 500–900 meters. Guatemala and southern Mexico. A slender shrub, the branches glabrous or when young sparsely puberulent; petioles 4–5 mm. long, the blades lance-oblong, 12–17 cm. long, long-acuminate, cuneate at the base, 3–5-plinerved, thick-coriaceous, glabrous; inflorescences axillary near the ends of the branches, 7–15-flowered, the pedicels 12–22 mm. long, the rachis 2.5–5 cm. long; calyx tube minutely puberulent; corolla 2–3 cm. long, minutely puberulent.

Satyria ovata A. C. Smith. Region of Tilarán, Guanacaste, at 600 meters. Nicaragua and Guatemala. Branches glabrous; petioles 5–10 mm. long, the blades ovate, thick-coriaceous, 5–10 cm. long, obtuse, cuneate or subattenuate at the base, 3–5-plinerved, glabrous; inflorescences axillary, 4–10-flowered, the rachis 1–1.5 cm. long, the pedicels 10–15 mm. long; calyx tube glabrous or puberulent; corolla 2 cm. long, glabrous or when young minutely pilose.

Satyria triloba A. C. Smith, Contr. U. S. Nat. Herb. 28: 523. 1932. Helechales del General, Valle de Diquís, 700 meters, *Pittier 12147*. Known only from the original collection. A slender shrub, the branches glabrous; petioles 3–5 mm. long, the blades ovate or oblong-ovate, 7–10 cm. long, acuminate, rounded at the base, 5-plinerved, glabrous; inflorescence short-racemose, 6–12-flowered, the rachis 1.5–3 cm. long, the pedicels 8–12 mm. long; corolla 2.5 cm. long, minutely puberulent. Distinguished among the local species by having a 3-lobate calyx.

Satyria Warszewiczii Klotzsch, Linnaea 24: 22. 1851. *Coralillo, Matapalo de uva, Palo de miel, Colmillos* (flowers), *Arrayán. S. clonantha* Klotzsch. *Riedelia Warszewiczii* Kuntze, Rev. Gen. 2: 384. 1891. Volcán de Barba, *Warscewicz*. Frequent in the forests, ranging from sea level up to 2,500 meters; region of San Ramón. Panama to southern Mexico. Usually a rather large, epiphytic shrub, the branches glabrous; leaves on petioles 8–15 mm. long, oblong or ovate-oblong, 10–23 cm. long, acuminate, narrowly cuneate at the base, thick-coriaceous, glabrous, 3-nerved or 3–5-

plinerved; inflorescences short-racemose, often on naked branches below the leaves, 8–30-flowered, the rachis 5–10 mm. long, the glabrous pedicels 15–25 mm. long; corolla red, the tip white, glabrous, 18–28 mm. long. The juicy, acidulous fruits, called Muelas, are rather good to eat.

SPHYROSPERMUM Poepp. & Endl.

Reference: A. C. Smith, Brittonia 1: 203. 1933.

Small, epiphytic shrubs, the branches short or elongate, often creeping or pendent; leaves short-petiolate or almost sessile, small, coriaceous, entire, obscurely nerved; flowers few, small, solitary in the leaf axils, the pedicels filiform, bibracteolate near the base; calyx tube continuous with the pedicel, subglobose or obconic, the limb 4–5-lobate; corolla subcylindric, 4–5-lobate; stamens as many or twice as many as the corolla lobes, equal or alternately slightly unequal, the filaments slender, the anthers produced into 2 tubules as long as the sacs or longer, dehiscent by oval, introrse clefts; ovary inferior; fruit subglobose or ellipsoid, dry or slightly fleshy, the pericarp hard and brittle, 4–5-celled.—No other species are found in Central America.

Sphyrospermum buxifolium Poepp. & Endl. *Sophoclesia cordifolia* var. *oophylla* Kuntze, Rev. Gen. 2: 384. 1891 (Angostura, *Kuntze 2153*). Frequent in forests of the central mountains, mostly at 1,000–1,500 meters; region of San Ramón. Nicaragua to Bolivia. A small and rather stiff shrub, the branches sometimes pendent, puberulent when young; leaves almost sessile, rounded to oval-oblong, 8–17 mm. long, rounded or obtuse at the apex, subcordate or rounded at the base, glabrous or when young sparsely pilose on the upper surface, obscurely 3–5-nerved; pedicels 10–18 mm. long; calyx pilose or glabrate, the tube 1–1.5 mm. long; corolla white or pink, 4–5.5 mm. long; stamens 4. The Costa Rican material is somewhat variable. Specimens from the region of San Ramón with smaller, thinner leaves, mostly oblong-oval in outline, may represent a distinct species or variety.

Sphyrospermum cordifolium Benth. Frequent in mountains of the central region, mostly at 1,000–2,400 meters; region of San Ramón. Ranging to Bolivia. Branches slender, puberulent or glabrous; petioles 1–3 mm. long; leaf blades thin-coriaceous, mostly ovate, 2–5 cm. long, obtuse or subacute, rounded or subcordate at the base, 3–5-nerved, glabrous; pedicels 10–25 mm. long, glabrous

or puberulent; calyx tube villous-pilose; corolla deep pink, 5–8 mm. long, glabrous or when young puberulent; stamens 8 or 10; fruit pale violet. The young leaves are pink or russet red.

Sphyrospermum majus Griseb. Forests on the slopes of Irazú, at about 1,500 meters; region of San Ramón. Southern Mexico to Haiti and Venezuela. Branches puberulent or glabrous; leaves almost sessile, thin-coriaceous, ovate or rounded-ovate, 1.5–3.5 cm. long, obtuse, subcordate or rounded at the base, glabrous or nearly so, 3–5-nerved; pedicels 1–2 cm. long; calyx pilose or glabrous; corolla white or pink, 5–7 mm. long, pilose or glabrous; stamens 4; fruit pale blue or purple.

Sphyrospermum Standleyi A. C. Smith, Brittonia 1: 210. 1933. Near Orosi, Prov. Cartago, *Standley 39622*. Known only from the original collection. A small, glabrous shrub; leaves ovate, subcoriaceous, 4.5–6 cm. long, obtuse, rounded or obtuse at the base, 5-nerved or 5-plinerved; pedicels 7–15 mm. long; calyx strigose; corolla 2–2.3 mm. long; stamens 4; fruit white, 3–5 mm. in diameter.

THIBAUDIA Ruiz & Pavón

Epiphytic shrubs, the leaves coriaceous, petiolate; inflorescence axillary or terminal, subfasciculate or racemose, the flowers pedicellate, the pedicels bibracteolate; calyx tube articulate with the pedicel, short-cylindric or campanulate, the limb erect-patent, 5-lobate, the lobes triangular, subacute; corolla subcylindric, 5-lobate; stamens equal, often almost as long as the corolla, the filaments distinct or connate, attached to the anther dorsally near its base, the tubules of the anthers equaling or longer than the sacs, opening by elongate, introrse clefts; fruit fleshy.—No other Central American species are known, other members of the genus being South American.

Thibaudia costaricensis Hoerold, Bot. Jahrb. 42: 311. 1909. *Psammisia rhododelphis* K. Schum. ex Wercklé, Bol. Fomento Costa Rica 1: 934. 1911, nomen. La Palma, Prov. San José, 1,500 meters, *Wercklé 20*. Occasional in forests of the central region, 1,400–2,200 meters. Honduras. A rather small shrub, the branches glabrous; petioles 3–5 mm. long, the blades chartaceous or thin-coriaceous, oblong or lance-oblong, 12–20 cm. long, caudate-acuminate, cuneate at the base, 5-plinerved, glabrous; inflorescences racemose, 15–30-flowered, the rachis 2–5 cm. long, the pedicels 10–15 mm. long; calyx sparsely puberulent or glabrous, the limb 1–2 mm. long; corolla red or deep pink, about 1 cm. long.

VACCINIUM L.

Reference: Sleumer, Die Arten der Gattung *Vaccinium* L. in Zentral und Südamerika, Notizbl. Bot. Gart. Berlin 13: 111. 1936.

Terrestrial or epiphytic shrubs; leaves alternate, coriaceous, entire or dentate; flowers small, axillary and solitary or in terminal or lateral racemes; corolla urceolate or cylindric, 5-lobulate; ovary inferior; stamens 10; fruit a berry with few or numerous seeds.—It is probable that a few other species exist in Central America. Species growing abundantly in the United States have sweet, juicy fruits that are consumed in enormous quantities, and are an important article of commerce.

Vaccinium consanguineum Klotzsch. *Arrayán.* Common in the higher mountains of the whole central region, at 1,500–3,300 meters. Panama to southern Mexico. Growing in oak forests or in subalpine meadows. A shrub or small tree of 1–4.5 meters, densely branched, almost glabrous; bark dark brown, somewhat scaly; leaves oblong or lanceolate, 2–4 cm. long, serrulate, acute; flowers white or pink, in racemes of few or numerous flowers; berries purple-black, edible, sweet, of good flavor. A characteristic shrub of the subalpine regions, growing abundantly in many localities. Sleumer refers some Costa Rican material to var. *irazuense* Sleumer (Notizbl. Bot. Gart. Berlin 13: 126. 1936; *V. irazuense* Sleumer, op. cit. 12: 138. 1934; type from Pedregales del Irazú, *Hoffmann 140*). This he describes as a small-leaved form of *V. consanguineum*, but to the writer its differences, if any, scarcely seem sufficient for the basis of a variety.

Vaccinium dissimile Blake, Journ. Bot. 53: 271. 1915. *Disterigma dissimile* Blake, Proc. Biol. Soc. Wash. 35: 120. 1922. La Palma, Prov. San José, 1,550 meters, *Tonduz 12456* (*J. D. Smith 7380*). Common in the region of the type. Endemic. A very small and slender shrub, sparsely branched, almost glabrous; leaves nearly sessile, broadly elliptic or almost orbicular, acutish at the apex; flowers axillary and solitary, pedicellate, not bracteate, pink; ovary pubescent.

Vaccinium floribundum HBK. Known in North America only from Cerro de Las Vueltas, at 3,000 meters, *Standley & Valerio 43679*. The species is a South American one, extending from Colombia to Bolivia. A low, stout, densely branched shrub, in appearance much like *V. consanguineum;* in that the anthers have long, dorsal, spurlike appendages; in *V. floribundum* the anthers

are not appendaged. The present species is an example of the distinctive high Andean species that are found in North America only in the paramos of Dota.

Vaccinium pachycardium Standl., sp. nov.—Frutex parvus epiphyticus, ramulis griseis, novellis dense pilosulis, dense foliatis; folia parva crasse coriacea ca. 1 mm. longe petiolata, lamina rotundato-ovata vel rotundata 7–9 mm. longa et fere aequilata, apice late rotundata, basi breviter cordata vel truncata, enervia, supra sparse pilosa, subtus glabra, integra; flores axillares solitarii, pedicellis ebracteatis gracillimis usque ad 8 mm. longis glabris; calyx 4-dentatus, dentibus triangularibus acutis; ovarium dense albido-pilosum; fructus ca. 6 mm. diam. glaber pallide purpureus. —Wet forest, El Muñeco, Río Navarro, Prov. Cartago, 1,500 meters, *Standley & Torres 51769* (type in U. S. Nat. Herb.). Although known only from the single collection cited, this plant is evidently related to *V. dissimile* Blake, which has much larger leaves, more or less acute or pointed at the apex.

Vaccinium poasanum Donn. Smith, Bot. Gaz. 24: 395. 1897; Sargent, Trees and Shrubs 1: *pl. 74*. 1903. Upper lake of Volcán de Poás, 2,340 meters, *J. D. Smith 6634*. Common on the upper slopes of the central mountains, at 2,000–3,000 meters. Endemic. A terrestrial or epiphytic shrub, as much as 4.5 meters high, glabrous; bark thin, deep cinnamon-brown; leaves oblong-elliptic, 5–9 cm. long, acuminate, entire, nerved; racemes short, many-flowered; corolla pale green, greenish yellow, or somewhat pinkish, campanulate, 1 cm. long; fruit pale yellow.

Vaccinium Smithianum Standl., sp. nov.—Frutex parvus gracilis epiphyticus ramosus, ramulis tortuosis, novellis dense hirtellis, dense foliatis; folia disticha parva brevissime petiolata crasse coriacea, lamina lanceolata vel ovato-lanceolata ca. 10 mm. longa et 5 mm. lata sensim acuta vel acuminata in sicco pallida enervia, costa supra paullo impressa, supra pilosa, subtus glabra, integra; flores axillares solitarii; pedicelli ebracteati; sepala 5 deltoidea acuta pilosa; corolla ovoidea 3 mm. longa, lobis minutis, apice hirtellis.— La Hondura, Prov. San José, 1,200–1,500 meters, *Standley & Valerio 51858* (type in Herb. Field Mus.). Collected also in the same locality in 1933, *Manuel Valerio 719*. The species is dedicated to Dr. Albert C. Smith of the New York Botanical Garden, monographer of the tribe Thibaudieae of this family. It is well marked by its narrow, distichous leaves.

Vaccinium Valerii Standl., sp. nov.—Frutex parvus epiphyticus parce ramosus, ramulis novellis dense albido-pilosis; folia coriacea brevissime petiolata e basi 3–5-nervia, lamina late ovata ad oblongo-ovata, 12–30 mm. longa 8–15 mm. lata, versus apicem obtusum sensim acutata, basi late rotundata, integra, glabra; flores axillares solitarii, pedicellis gracillimis glabris usque ad 15 mm. longis ebracteatis; ovarium parvum globosum pilosum; calyx campanulatus 1 mm. longus breviter 4-dentatus, dentibus breviter hirtellis exceptis glaber; corolla rosea cylindracea angusta glabra 7 mm. longa, lobis brevissimis.—Cerro de Las Caricias, north of San Isidro, Prov. Heredia, 2,000–2,400 meters, *Standley & Valerio 52483* (type in U. S. Nat. Herb.). Collections from Cerros de Zurquí, La Hondura, and Fraijanes probably represent the same species. It is similar to *V. dissimile*, but differs in the distinct shape of the leaves, which are acute at the apex.

MYRSINACEAE. Myrsine Family

Reference: Mez, Pflanzenreich IV. 236. 1902.

Shrubs or trees, or the plants rarely suffrutescent; leaves alternate, often clustered near the apices of the branches, simple, entire or dentate, usually punctate or lineolate; stipules none; flowers normally perfect, small, mostly white or pink, variously arranged, most often 5-parted, regular; calyx inferior, the segments free or somewhat connate, usually ciliate and punctate, valvate, imbricate, or sinistrorsely contorted, persistent; corolla usually rotate and gamopetalous, rarely campanulate or of free petals, generally punctate or lineolate; stamens of the same number as the petals and opposite them, the filaments commonly short, connate with the corolla tube or rarely free, the anthers usually dorsifixed, opening by introrse slits or rarely by apical pores; ovary free, 1-celled, the style short or elongate, the stigma variable in form, the ovules most often numerous; fruit baccate or drupaceous, indehiscent, 1-seeded.—No other genera are known in Central America.

ARDISIA Swartz

Shrubs or small trees, rarely only suffrutescent; leaves petiolate or rarely sessile, entire, crenate, or serrate; flowers 5-parted, the inflorescence very variable in structure, usually paniculate, terminal or axillary, the flowers pedicellate; sepals free or short-connate; petals short-connate, the lobes dextrorsely contorted, in anthesis recurved or spreading, usually glabrous on the outer surface; filaments usually very short, the anthers elongate, usually acute,

dehiscent by 2 introrse slits; ovules commonly numerous; fruit globose, 1-seeded, often very juicy.—Numerous other species of this large genus are known from Central America. The juicy fruits are of good flavor, and often are eaten. Some species are handsome and ornamental plants because of their large panicles of flowers or showy fruits.

Ardisia auriculata Donn. Smith, Bot. Gaz. 24: 395. 1897. Forests of Suerre, Llanuras de Santa Clara, 300 meters, *J. D. Smith 6640*. Region of San Ramón, about 1,200 meters. Endemic. A glabrous shrub or small tree; leaves sessile, thin, bright green when dried, obovate-oblong, as much as 40 cm. long and 13 cm. wide, acuminate, auriculate and clasping at the base, entire, not punctate; panicles terminal, large, many-flowered, the flowers racemose, the very slender pedicels 6–10 mm. long or longer; sepals ovate, acute, 2 mm. long, maculate; fruit globose, 6–7 mm. in diameter, coarsely maculate.

Ardisia Brenesii Standl., sp. nov.—Frutex, ramulis crassis teretibus densissime pilis stellatis plerumque breviter stipitatis ferrugineo-tomentosis, internodiis brevibus; folia majuscula arcte sessilia papyracea anguste oblanceolato-oblonga 14–24 cm. longa 4–5.5 cm. lata apice acuminata vel interdum anguste rotundata, basin versus longe sensim attenuata, basi ipsa truncata vel late rotundata, integra, supra in sicco fusco-viridia glabra vel glabrata, subtus brunnescentia ubique, ad costam densius, sparse ferrugineo-stellato-puberula vel tomentella, costa gracili elevata, nervis lateralibus irregularibus angulo semirecto vel latiore divergentibus, marginibus plus minusve recurvis; inflorescentia anguste paniculata ut videtur tripinnata (perfecta non visa) longipedunculata ca. 9.5 cm. longa foliaceo-bracteata pilis stellatis ex parte stipitatis dense ferrugineo-tomentosa, pedicellis gracilibus ca. 5 mm. longis; alabastra ca. 3.5 mm. longa oblongo-ovoidea dense ferrugineo-tomentulosa; sepala parva obtusa grosse punctata ciliolata; petala elliptico-oblonga apiculata extus lepidotula.—Cataratas de San Ramón, April, 1935, *Brenes 20537* (type in Herb. Field Mus.). The available material is unsatisfactory, all the flowers having fallen from the inflorescence. The form of the leaves is so distinctive that there can be no doubt regarding the distinctness of the species here described, which is noteworthy for the very narrow leaves, gradually tapered to a broad and sessile base.

Ardisia calycosa Hemsl. Known in Costa Rica only from El Silencio de Tilarán, where it has been collected several times, in

forest at about 800 meters. Described from Chontales, Nicaragua. A shrub of 1.5–3 meters, glabrous throughout, the branches slender; leaves sessile or nearly so, very narrowly oblanceolate-oblong, mostly 10–15 cm. long, long-acuminate, long-attenuate to the base, obscurely crenulate; inflorescence rather few-flowered, lax, bipinnate-paniculate, the pedicels slender, about 12 mm. long or in fruit often 2 cm. long or more; sepals green, accrescent in fruit, oblong-linear, often 1 cm. long; fruit scarlet. An exceptionally well marked species because of the curious sepals, long and narrow and much larger than in any other local species.

Ardisia compressa HBK. *Tucuico, Murta* (probably incorrect for this plant). *A. cuspidata* Benth. Bot. Voy. Sulph. 123. 1844 (Cocos Island, *Barclay*). *Tinus cuspidata* Kuntze, Rev. Gen. 2: 974. 1891. Frequent in forests, tierra caliente of both coasts and ascending the slopes of the mountains to at least 1,800 meters, but usually rare in the lowlands; region of San Ramón; Guanacaste; Cocos Island. Mexico to Venezuela. A shrub of 2–3 meters, or sometimes a tree of 6 meters, glabrous throughout or somewhat puberulent on the young parts; leaves on very short petioles, coriaceous, lanceolate to oblong or elliptic, mostly 10–18 cm. long, acute or acuminate, acute at the base, usually entire, dark green in the living state, minutely punctate beneath; inflorescences terminal and lateral, many-flowered, tripinnate-paniculate, the flowers corymbose, on pedicels about 6 mm. long; buds 5–6 mm. long, glabrous; sepals rounded; petals white or pinkish; fruit 6 mm. in diameter, dark red at first, at maturity black, edible. The species is frequent in many parts of Central America, more so than any other member of the genus. The specimens exhibit a great deal of variation, and it may well be that careful study will show they really represent several species.

Ardisia copeyana Standl., sp. nov.—Arbuscula ut videtur omnino glabra, ramulis crassis ferrugineis subteretibus; folia sparsa breviter petiolata subcoriacea magna, petiolo crasso ca. 1 cm. longo; lamina oblongo-elliptica ca. 20 cm. longa atque 7–9 cm. lata acuta vel breviter acuminata, basi contracto-acuta, obscure crenulato-undulata vel subintegra, supra lucida, nervis venisque plus minusve prominentibus, subtus fere concolor in sicco brunnescens, costa crassiuscula elevata, nervis lateralibus tenerrimis angulo lato interdum fere recto abeuntibus prominulis; inflorescentia terminalis bipinnato-paniculata subpyramidalis breviter pedunculata ca. 13 cm. longa et aequilata, ramis crassis patentibus, floribus numerosis

breviter racemosis, racemis subcorymbiformibus, pedicellis rectis rigidis usque 4 mm. longis; sepala 5 ovato-rotundata 1.5 mm. longa apice rotundata glabra crenulata sparse rubro-punctata; fructus globosus 5 mm. diam. dense punctatus glaber.—El Copey, Prov. San José, 1,650 meters, April, 1928, *H. E. Stork 1592* (type in Herb. Field Mus.). "A small tree; fruit at first red, then black." The material is in advanced fruiting condition. The plant shows no outstanding characters, but it has been impossible to associate it satisfactorily with any described species of Central America.

Ardisia crassiramea Standl., sp. nov.—Frutex vel arbuscula 2–4-metralis, ramis crassissimis in sicco angulatis vel rugosis, densissime adpresso-ferrugineo-lepidotis; folia sparsa vel ad apices ramorum subverticillatim congestis modica subcoriacea breviter petiolata, petiolo crasso 1–2 cm. longo dense ferrugineo-lepidoto; lamina anguste oblanceolato-oblonga 10–14 cm. longa 2–3.5 cm. lata subabrupte longiuscule anguste acuminata, basin versus longe sensim attenuata, integra vel apicem versus obscure crenulata, supra in statu juvenili sparse lepidota cito glabrata, nervis prominulis sed non conspicuis, subtus ferruginea densissime minute lepidota; inflorescentia terminalis magna pyramidalis permultiflora pedunculata interdum prope basin foliata usque 20 cm. longa atque 12 cm. lata tripinnato-paniculata, ramis densissime ferrugineo-lepidotis adscendentibus, floribus subcorymbosis congestis, pedicellis crassis minus quam 2 mm. longis saepe fere nullis; alabastra vix 3 mm. longa; sepala 5 ovata acutiuscula ca. 1.5 mm. longa minute glanduloso-laciniata obscure punctata sparse lepidota vel glabrata; petala extus glabra.—Humid forest, Cerros de San Antonio de San Ramón, 1,200 meters, July, 1927, *Brenes 5652* (type in Herb. Field Mus.). In forests and pastures, La Palma de San Ramón, August, 1924, *Brenes 4033*. A well marked species, noteworthy for the large and much branched inflorescence, in which the very numerous small flowers are densely congested, so that the whole inflorescence suggests that of some species of *Psychotria*.

Ardisia Cutteri Standl. Journ. Wash. Acad. Sci. 17: 521. 1927. Wet forest near Pejivalle, Prov. Cartago, 900 meters, *Standley & Valerio 47122*. Known only from the original collection. A small tree with stout, terete branches; leaves oblanceolate, about 52 cm. long and 15 cm. wide, rounded at the apex, long-attenuate from near the apex nearly or quite to the base of the very short, thick petiole, entire, subcoriaceous, glabrous above and minutely punctate, paler beneath, sparsely and minutely brown-punctate;

inflorescence terminal, paniculate, 17 cm. long and broad, tripinnate, the branches brown-lepidote, the flowers umbellate, on pedicels 6–8 mm. long; sepals 5, orbicular, 2 mm. long, brown-ciliolate; fruit 1 cm. in diameter, densely and coarsely punctate. Well marked by the very large, narrow leaves, rounded at the apex, and by the fruits, larger than in any other species. The species was named for Mr. Victor M. Cutter, former President of the United Fruit Company.

Ardisia Dodgei Standl., sp. nov.—Ramuli crassiusculi dense minute adpresso-ferrugineo-lepidoti; folia breviter petiolata majuscula subcoriacea, petiolo crasso usque 8 mm. longo dense lepidoto; lamina elliptica 20–22 cm. longa 10 cm. lata abrupte breviter acuminata, basi obtusa, integra, supra glabra densissime minute puncticulata, nervis obscuris, subtus pallidior ubique subsparse minute brunneo-lepidota, costa crassiuscula elevata, nervis lateralibus teneris angulo lato fere recto abeuntibus; inflorescentia (sejuncta tantum visa) densa multiflora dense bracteata, bracteis foliaceis magnis membranaceis ut videtur coloratis usque 1.5 cm. longis atque aequilatis apice rotundatis flores arcte involventibus minute adpresso-lepidotis persistentibus, pedicellis ca. 3 mm. longis lepidotis; alabastra 11 mm. longa; sepala 5 subrotundata, apice rotundata 5 mm. longa sparse lepidota epunctata integra; corolla extus glabra, lobis usque 8 mm. longis patentibus punctis paullo elongatis sat dense conspersis obtusis; antherae 4 mm. longae.—Low hills above Río Paquita, Prov. San José, August, 1936, *C. W. Dodge & V. F. Goerger 9881* (type in Herb. Field Mus.; duplicate in herb. Mo. Bot. Gard.). Easily recognized among Costa Rican species by the compact inflorescences with large corollas and abundant, large, persistent bracts.

Ardisia furfuracea Standl. Journ. Wash. Acad. Sci. 17: 525. 1927. Wet forest, Cerro de Las Lajas, north of San Isidro, Prov. Heredia, 2,300 meters, *Standley & Valerio 51556*. Known only from the original collection. A small tree, the branches densely and coarsely furfuraceous with loose, dark brown scales; leaves short-petiolate, the petioles marginate nearly or quite to the base, the blades oblong or narrowly oblong, 17–27 cm. long, 4–7.5 cm. wide, acute at the base and apex, entire, thick, glabrous above or nearly so, very densely lepidote beneath with coarse, loose, brown scales; inflorescence terminal, paniculate, pyramidal, 20 cm. long and broad, tripinnate, the flowers sessile or very short-pedicellate; buds 4 mm. long; sepals orbicular, 2 mm. long, glabrous, coarsely

punctate, minutely denticulate. The corolla is white, with pinkish dots. The species is related to *A. palmana*, which has a more open inflorescence and lacks the coarse, furfuraceous covering so conspicuous in *A. furfuracea*.

Ardisia glanduloso-marginata Oerst. Vid. Medd. Kjoebenhavn 128. 1861. Oak forest of Volcán de Irazú, 2,400–2,700 meters, *Oersted* (photo. of type in Herb. Field Mus.; also a specimen of the original collection, *No. 25*, obtained in January, 1847). Frequent on middle and upper slopes of the central mountains, mostly at 2,100–2,700 meters; region of Dota. Endemic. A shrub or tree of 3–7.5 meters, the trunk as much as 12 cm. in diameter; branches minutely furfuraceous or glabrate; leaves petiolate, elliptic, elliptic-oblong, or obovate-elliptic, mostly 7–12 cm. long, acuminate, acute at the base, conspicuously crenate or subentire, glabrous above, minutely and sparsely appressed-lepidote beneath or glabrate, conspicuously glandular-punctate, especially along the margins, rather thin; inflorescence terminal, many-flowered, 2–3-pinnate-paniculate, about equaling the leaves, furfuraceous, the pedicels 8 mm. long or less; buds 6 mm. long, glabrous; sepals ovate, rounded or acutish at the apex; petals acute, lineolate; fruit 5 mm. in diameter. Regarding this species, Austin Smith's notes supply the following information: Bark smooth, or scaly near the base, pale brown; cambium layer bright crimson; freshly cut wood bright, rosy pink; young fruit crimson, black at maturity; flowers with a strong fragrance similar to that of lilacs (*Syringa*); corolla creamy white, the calyx and pedicels lilac; crown rounded.

Ardisia insignis Mez & Pittier, Bull. Herb. Boiss. II. 3: 237. 1903. Forests of Tsaki, Talamanca, 200 meters, *Tonduz 9575*. Known only from the original collection. Branches very thick; leaves almost sessile, oblong, about 35 cm. long and 10 cm. wide, short-acuminate, gradually narrowed toward the base, entire, thick-coriaceous, glabrous, when young very densely glandular-punctate; inflorescence terminal, 3-pinnate-paniculate, pyramidal, the branches thick, the flowers short-spicate, sessile, 5-parted; fruit 8 mm. in diameter.

Ardisia irazuensis Oerst. Vid. Medd. Kjoebenhavn 124. 1861. *Tinus irazuensis* Kuntze, Rev. Gen. 2: 974. 1891. Volcán de Irazú, 2,700 meters, *Oersted* (photo. of type in Herb. Field Mus.). Reported by Mez also from Santo Domingo, Prov. Puntarenas. Endemic. Branches ferruginous-tomentulose when young; leaves short-petio-

late, obovate, about 9.5 cm. long and 4.5 cm. wide, abruptly and shortly subcaudate-acuminate, cuneate at the base, entire, glabrous above, minutely lepidote beneath; inflorescence terminal, many-flowered, compactly 2–3-pinnate-paniculate, ferruginous-tomentulose or glabrate, the pedicels 4 mm. long or less; buds 4 mm. long, glabrate; sepals rounded at the apex, punctate. The species is closely related to *A. compressa* and doubtfully distinct. In his key to species of *Ardisia*, Mez contrasts the two species, *A. irazuensis* as having symmetric petals and *A. compressa* as having conspicuously asymmetric ones. These characters are not easily if at all distinguishable in the ample material available for study, and it is doubtful whether they are of much importance. Costa Rican material has been referred incorrectly to *A. cuspidata* Benth.

Ardisia meiantha Donn. Smith, Bot. Gaz. 44: 115. 1907. Near Cartago, 1,500 meters, *Maxon 44*. Leaves small, on petioles 5–7 mm. long, lance-elliptic, acute at each end, 4–7 cm. long, coriaceous, entire, punctate on both surfaces, glabrous; inflorescence bipinnate-paniculate, short-pedunculate, densely flowered, very minutely furfuraceous, 2.5–5 cm. long, the flowers mostly 6-parted, scarcely 3.5 mm. long, the pedicels 2–3 mm. long, racemose; sepals 1 mm. long, oval, minutely ciliolate; anthers 0.5 mm. long. I have seen no material of this species.

Ardisia minor Standl. Journ. Wash. Acad. Sci. 17: 522. 1927. Wet forest, Cerros de Zurquí, northeast of San Isidro, Prov. Heredia, 2,200 meters, *Standley & Valerio 50571*. Frequent in forests of the central mountains, 1,100–2,400 meters; region of San Ramón. Panama. A shrub or small tree, 1.5–6 meters high, the branches glabrous; leaves short-petiolate, narrowly elliptic or oblong-elliptic, often broadest above the middle, 3–6.5 cm. long, 1–2.5 cm. wide, acute or short-acuminate, acute or cuneate at the base, entire, rather thin, glabrous; young leaves coarsely punctate; inflorescence terminal, usually shorter than the leaves, rather few-flowered, bipinnate-paniculate, glabrous, the flowers umbellate, the pedicels 2–5 mm. long; sepals 5, rounded-ovate or orbicular, 1.5 mm. long, green, with scarious, whitish margins, coarsely punctate; fruit black, 6 mm. in diameter. Closely related to *A. compressa*, which has usually larger leaves, an ampler, more branched inflorescence, and pale sepals.

Ardisia myriodonta Standl. Humid forests of the mountains of Guanacaste, 500–600 meters. Panama. Plants suffrutescent,

usually less than a meter high, the stems usually simple, glabrous or nearly so; leaves short-petiolate, thin, oblong-elliptic, 12–25 cm. long, short-acuminate, long-attenuate to the base, glabrous, densely red-punctate along the margin, the margin very densely pectinate-serrate with narrow, acute teeth; inflorescence terminal, small, sessile, many-flowered, dense, the flowers subcorymbose, on pedicels 3–5 mm. long; sepals 5, lance-oblong, attenuate, 2 mm. long, punctate; fruit globose, black or dark purple, 6 mm. in diameter. Among Costa Rican species this is easily recognized by its low habit and conspicuously pectinate-serrate leaves.

Ardisia Nevermannii Standl. Journ. Wash. Acad. Sci. 17: 524. 1927. Wet forest, Finca Montecristo, on the Río Reventazón below El Cairo, Prov. Limón, 25 meters, *Standley & Valerio 48603*. Endemic and known only from the vicinity of the original locality. A slender shrub of 1.5–2.5 meters, the branches densely leafy at the tips, very densely hirsute with long, stiff, spreading, ferruginous hairs; leaves sessile or nearly so, oblanceolate or oblanceolate-oblong, 16–30 cm. long, 5–8 cm. wide, acuminate, long-attenuate to the base, entire, thin, hirsute above, densely ferruginous-hirsute and paler beneath, conspicuously black-punctate; inflorescence terminal, pendent, tripinnate-paniculate, the flowers umbellate, the pedicels 5–8 mm. long, hirsute; sepals 5, 1.5 mm. long, black-punctate, hispidulous; petals purple or purple-pink, coarsely punctate; fruit black, 7–8 mm. in diameter. Outstanding because of the abundant, hirsute pubescence.

Ardisia nigropunctata Oerst. Vid. Medd. Kjoebenhavn 127. *pl. 2*. 1861. *Tinus nigropunctata* Kuntze, Rev. Gen. 2: 974. 1891. Volcán de Irazú, 2,400–2,700 meters, *Oersted* (photo. of type, *Oersted 28D*, in Herb. Field Mus.). Frequent in forests of the central region, mostly at middle elevations; also in the Atlantic tierra caliente and on the Caribbean slopes of Guanacaste. Ranging to Honduras and British Honduras. A shrub or tree of 1.5–6 meters, the branches glabrous or minutely lepidote; leaves short-petiolate, elliptic or oblong-elliptic, about 20 cm. long and 7.5 cm. wide, short-acuminate, acute or attenuate at the base, rather thin, usually green when dried, entire, glabrous, conspicuously black-punctate; inflorescence terminal, many-flowered, 3–4-pinnate-paniculate, pyramidal, usually longer than the leaves, glabrous or nearly so, the pedicels about 4 mm. long, subcorymbose; buds 5 mm. long, glabrous, densely black-punctate. The flowers are purple-pink, the fruit dark red or purple-black.

Ardisia oblanceolata Standl. Talamanca Valley. Panama. A tree of 6 meters, the branches glabrate, densely leafy at the tips; leaves short-petiolate, narrowly oblong-oblanceolate, 14–20 cm. long, 3.5–5 cm. wide, long-acuminate, long-attenuate to the base, entire, glabrous, punctate beneath; inflorescence bipinnate-paniculate, few-flowered, the flowers umbellate, the slender pedicels 6–8 mm. long; sepals 5, lance-linear, attenuate to the apex, 3 mm. long, glandular-ciliolate; fruit red, 1 cm. long, glandular-punctate.

Ardisia opegrapha Oerst. Vid. Medd. Kjoebenhavn 126. 1861. *Ardisia Oliveri* Masters, Gard. Chron. 1877: 680. 1877; Hook. f. Bot. Mag. *pl. 6357*. 1878. Aguacate and Jarís, 450–600 meters, *Oersted* (specimen of the original collection and photo. of type in Herb. Field Mus.). Frequent at middle elevations, mostly at 1,200 meters or less; also in forests of the tierra caliente; region of San Ramón. Nicaragua (the species is reported by Mez from "Alajuala," Guatemala, evidently an error for Alajuela, Costa Rica). A shrub, the branches glabrous; leaves short-petiolate, elliptic-lanceolate to rather broadly elliptic or narrowly oblanceolate, mostly 12–25 cm. long, acuminate, acute or attenuate at the base, entire, glabrous, densely lineolate-punctate beneath; inflorescence usually pink throughout, bipinnate-paniculate, glabrous, shorter than the leaves, the flowers corymbose, the pedicels 15 mm. long or less; bracts conspicuous, large, green, narrow, finally deciduous; flowers 12 mm. long, glabrous; fruit 5 mm. in diameter.

Ardisia palmana Donn. Smith, Bot. Gaz. 27: 434. 1899. *Tucuico*. Forests of La Palma, Prov. San José, 1,460 meters, *Pittier & Tonduz 7460* (*12632*). Frequent in forests of the central region; region of San Ramón; mostly at 1,200–1,800 meters. Endemic. A shrub or tree, sometimes 10 meters high, with thick branches, the young branches densely appressed-ferruginous-lepidote; leaves sessile or nearly so, oblong-lanceolate or elliptic-lanceolate, about 20 cm. long and 6 cm. wide, but often considerably smaller, acute or acuminate, acute or attenuate at the base, entire, glabrate above, densely and minutely lepidote beneath, punctate and lineolate; inflorescence terminal, many-flowered, 4-pinnate-paniculate, densely furfuraceous, usually large and pyramidal, the flowers sessile or nearly so, glomerate, 5 mm. long, glabrous; sepals suborbicular, ciliolate, punctate; petals rounded at the apex, punctate; fruit black or dark purple, edible.

Ardisia Pittieri Mez, Bull. Herb. Boiss. II. 3: 236. 1903. In forest, Tuis Valley, 750 meters, *Tonduz 11351*. Also Las Vueltas de Tucurrique, 700 meters. Endemic. A small tree, the branches glabrous; leaves clustered at the ends of the branches, cuneate-oblong or subobovate, as much as 30 cm. long and 10 cm. wide, short-acuminate or acute, long-attenuate to the base, entire, subsessile, rigid-coriaceous, brown-lepidote beneath; inflorescence terminal, very large, tripinnate-paniculate, the flowers corymbose, 5-parted, on pedicels 12 mm. long or less; sepals ciliate, punctate and lineolate; buds 1 cm. long; petals not conspicuously punctate; fruit globose, 1 cm. in diameter. Known to the writer only from description.

Ardisia pleurobotrya Donn. Smith, Bot. Gaz. 25: 148. 1898. *Tucuico*. Potrero del Alto, Volcán Poás, 2,450 meters, *Pittier 389*. Frequent in humid forest of the central mountains, chiefly at 2,200–2,800 meters. Endemic. A shrub or small tree, 6 meters high or less, the young branches ferruginous-lepidote, stout; leaves petiolate, elliptic to oblanceolate-oblong, about 7 cm. long and 3 cm. wide, coriaceous, short-acuminate to obtuse, attenuate to the base, glabrous above, appressed-lepidote beneath, entire; inflorescences axillary, long-pedunculate, many-flowered, bipinnate-paniculate, densely lepidote, the flowers corymbose or umbellate, the pedicels 8 mm. long or less; buds 5 mm. long; sepals lepidote; petals pink or pinkish white; fruit 5 mm. in diameter, black-punctate.

Ardisia revoluta HBK. *Tucuico*. Common in some localities of the Pacific tierra caliente, in thickets or forest; Guanacaste; region of San Ramón. Panama to Mexico. A shrub or tree of 2–6 meters, the branches glabrous; leaves short-petiolate, elliptic to oblong-obovate, about 15 cm. long and 6 cm. wide, obtuse or rounded at the apex, acute or attenuate at the base, entire, thick and subcoriaceous, glabrous, inconspicuously punctate; inflorescence terminal, equaling or longer than the leaves, the flowers racemose, long-pedicellate, glabrous; sepals ovate, rounded at the apex; petals lineolate-punctate, white or pinkish; fruit black, 4–5 mm. in diameter. The rather juicy fruit is edible. The handsome fruiting branches often are employed for decorative purposes.

Ardisia spectabilis Standl., sp. nov.—Ramuli crassi glabri vel glabrati apice dense foliati, internodiis brevissimis; folia inter maxima breviter petiolata firme membranacea, petiolo crassissimo vix ultra 1.5 cm. longo; lamina anguste oblongo-oblanceolata ca.

50 cm. longa et 12 cm. lata acuta vel brevissime acuminata, basin versus longissime sensim attenuata fere ad basin serrata glabra punctata, supra in sicco opaca olivaceo-viridis et inter venas striolata, subtus paullo pallidior, costa gracili elevata, nervis lateralibus tenerrimis prominentibus angulo semirecto adscendentibus, venulis prominulis numerosissimis, ultimis arcte subparallelis; inflorescentiae axillares paniculatae pauciflorae subdensae vix 2 cm. longae sed ca. 13 cm. longe pedunculatae, ramis brevibus sparse minute brunneo-furfuraceis, floribus cymose dispositis parvis, brevissime pedicellatis, bracteis nullis vel caducis; sepala vix ultra 1 mm. longa rotundata apice denticulata glabra dense punctata; petala 2.5 mm. longa oblongo-ovalia apice rotundata glabra dense fusco-punctata; filamenta crassiuscula glabra petalis paullo breviora, antheris vix 0.5 mm. longis.—Cataratas (Los Angeles) de San Ramón, April, 1935, *Brenes 20530* (type in Herb. Field Mus.). Castilla, July 24, 1936, *C. W. Dodge 9283;* corolla brown outside, cinnamon buff within.

Ardisia stenophylla Donn. Smith, Bot. Gaz. 24: 395. 1897. Forests of Shirores, Talamanca, Atlantic tierra caliente, *Pittier & Tonduz 9173*. Also forests of Tsaki, Talamanca. Endemic. Young branches minutely appressed-lepidote, soon glabrate; leaves about 16 cm. long and 3 cm. wide, thin-membranaceous, entire, glabrous, minutely and inconspicuously black-puncticulate beneath; inflorescence terminal, few-flowered, lax, bipinnate-paniculate, much shorter than the leaves, minutely lepidote at first, the flowers umbellate, on pedicels 10 mm. long; buds 7 mm. long, glabrous; sepals acute, ciliolate; petals acute; ovary glabrous. Known to the writer only from description.

Ardisia tilaranensis Standl. Journ. Wash. Acad. Sci. 17: 524. 1927. Moist forest, Quebrada Serena, southeast of Tilarán, Guanacaste, 700 meters, *Standley & Valerio 46169*. Moist forests on both slopes of the mountains of Tilarán. Endemic. A slender shrub of 1.5–3 meters, the young branches densely furfuraceous with coarse, brown, appressed scales; leaves sessile or nearly so, narrowly oblanceolate-oblong, 11–18 cm. long, 3–5 cm. wide, acuminate or long-acuminate, narrowed to the auriculate and often amplexicaul base, thin, sinuate-crenate, glabrous above, rather densely appressed-brown-lepidote beneath and conspicuously black-punctate; inflorescence shorter than the leaves, bipinnate-paniculate, the flowers umbellate, on pedicels 5 mm. long, the bracts con-

spicuous, large, foliaceous; sepals 5, acute or obtuse, punctate; fruit 6–7 mm. in diameter, coarsely black-punctate.

CONOMORPHA A. DC.

Shrubs or small trees, glabrous or lepidote; leaves scattered or subverticillate, usually entire; flowers 4–5-parted, in axillary racemes or panicles, small, white or yellowish, short-pedicellate; sepals more or less connate below or almost distinct; petals short-connate, valvate or obscurely imbricate; filaments short or none, the anthers elongate, dehiscent by 2 introrse slits; fruit small, 1-seeded, dry or nearly so.—No other species are known from Central America.

Conomorpha peruviana A. DC. var. **rostrata** (Hassk.) Mez. Reported from the region of El General, collected by Skutch. Lesser Antilles; the typical form of the species extends from Venezuela to Peru. A small tree, the young branchlets ferruginous-lepidote; leaves petiolate, suborbicular or obovate, about 5 cm. long, caudate-acuminate, acute at the base; inflorescence bipinnate-paniculate, much shorter than the leaves; flowers 2 mm. long, 4-parted, the sepals fimbriate, punctate.

GRAMMADENIA Benth.

Glabrous shrubs; leaves sessile or nearly so, entire; flowers small, in elongate, axillary racemes, pedicellate, 5-parted; sepals short-connate at the base; petals short-connate, spreading in anthesis; filaments very short or none, the anthers usually broader than long, rounded and usually emarginate at the apex, opening by apical pores.—No other species are found in continental North America.

Grammadenia costaricana (Hemsl.) Mez, Pflanzenreich IV. 236: 230. 1902. *Cybianthus costaricanus* Hemsl. Biol. Centr. Amer. Bot. 2: 290. 1882. Type *Endres 146*, without definite locality. Slopes of La Carpintera and Volcán de Barba, at 1,400–2,400 meters; region of San Ramón, about 1,200 meters. Endemic. A terrestrial shrub 3–4.5 meters high, or more often a small, epiphytic shrub; leaves oblanceolate-oblong, 4.5–10 cm. long, acute or obtuse, gradually narrowed to the sessile base; racemes many-flowered, somewhat shorter than the leaves, the slender pedicels 2–4 mm. long; flowers about 1.5 mm. long, 5–6-parted, white; fruits small, globose, purple-black.

PARATHESIS Hook. f.

Shrubs or small trees, the young branches tomentose or tomentulose; leaves petiolate, entire or rarely crenulate, usually minutely

lepidote; flowers 5-parted, in terminal or axillary panicles, pink or white, the pedicels subumbellate or corymbose; sepals small, more or less connate; corolla rotate, 5-parted, the lobes valvate, narrow, pubescent or tomentose, at least on the outer surface; filaments conspicuous, filiform, the anthers sagittate-lanceolate, dehiscent by 2 introrse slits; ovules few.—Other species of the genus occur in Central America.

Parathesis aeruginosa Standl. Journ. Wash. Acad. Sci. 17: 526. 1927. Forests of Tremendal, near San Ramón, 1,300–1,400 meters, *Tonduz 17659*. Region of San Ramón, 1,000–1,400 meters. Extending to British Honduras. A stout shrub 1.5–2 meters high, the branches densely stellate-tomentose with ferruginous, sessile hairs; leaves on short, stout petioles, elliptic-oblong, 12–16 cm. long, abruptly short-acuminate, cuneately narrowed to the acute base, obscurely undulate-crenate, green and glabrate above, densely ferruginous-stellate-hispidulous beneath; inflorescence pyramidal, tripinnate, many-flowered, the branches densely ferruginous-tomentose; pedicels 2–4 mm. long; buds 3.5 mm. long; sepals stellate-hirtellous; petals 2.5 mm. long, stellate-tomentose on both surfaces. Related to *P. sessilifolia*, which has similar pubescence but chiefly of stipitate, not sessile hairs.

Parathesis fusca (Oerst.) Mez, Pflanzenreich IV. 236: 175. 1902. *Tucuiquillo*. *Ardisia fusca* Oerst. Vid. Medd. Kjoebenhavn 127. *pl. 2*. 1861. *Tinus fusca* Kuntze, Rev. Gen. 2: 974. 1891. Based in part upon material collected by Oersted on Volcán de Irazú. Also reported from Nicaragua. Branches densely appressed-ferruginous-tomentose; leaves short-petiolate, elliptic, about 8.5 cm. long, 3.5 cm. wide, short-acuminate, acuminate-acute at the base, crenate, pilose beneath on the nerves; inflorescence many-flowered, tripinnate-paniculate, pubescent, the pedicels 6 mm. long or less; buds 4 mm. long, tomentose; sepals not punctate; petals not punctate, lanceolate.

Parathesis glabra Donn. Smith, Bot. Gaz. 31: 115. 1901. Forest near El Copey, 1,800 meters, *Tonduz 11714*. Mountains of Dota, 1,600–2,450 meters, also on the slopes of La Carpintera, and near San José. Endemic. A shrub or tree of 3–6 meters, glabrous almost throughout; leaves petiolate, elliptic, about 7.5 cm. long, acuminate, acute at the base, entire, densely and conspicuously punctate; inflorescences few- or many-flowered, bipinnate-panicu-

late, the pedicels slender, 8 mm. long or less; buds 4–5 mm. long, puberulent. The dark red or purple fruits are eaten.

Parathesis microcalyx Donn. Smith, Bot. Gaz. 48: 295. 1909. La Colombiana, Llanuras de Santa Clara, 200 meters, *Pittier 7591* (*13410*). Young branches ferruginous-pubescent; leaves short-petiolate, lance-obovate, 9–12.5 cm. long, cuspidate-acuminate, attenuate to the base, entire, glabrous above, glabrate beneath, punctulate and lineolate; panicles 6–7 cm. long, ferruginous-pubescent, the pedicels 1.5–3 mm. long; flowers about 3.5 mm. long, the corolla glabrous within; ovary pubescent at the apex. Known to the writer only from description.

Parathesis serrulata (Swartz) Mez. Reported from Turrialba. Mexico to West Indies and Venezuela. A shrub or small tree, the branches ferruginous-lepidote; leaves short-petiolate, oblong to elliptic-lanceolate or narrowly elliptic, about 16 cm. long and 4 cm. wide, acuminate, acute at the base, crenulate or subentire, glabrous above, beneath ferruginous-lepidote or glabrate; inflorescence many-flowered, subpyramidal, tripinnate-paniculate, puberulent or tomentulose, the pedicels 4 mm. long or less; buds 4 mm. long.

Parathesis sessilifolia Donn. Smith. Reported from Costa Rica, collected by Endres (*Nos. 210, 236*), the locality not indicated. Guatemala. Branches densely stellate-tomentose with mostly stipitate hairs; leaves sessile, oblong, about 15 cm. long and 5 cm. wide, acuminate, gradually narrowed to the acute base, crenate, glabrate above, ferruginous-villous beneath and black-punctate; inflorescence many-flowered, pyramidal, laxly 4-pinnate-paniculate, the pedicels 6 mm. long or less; buds 5–6 mm. long, ferruginous-tomentose; ovary leprose at the apex.

Parathesis Storkii Standl. Field Mus. Bot. 8: 31. 1930. San Cristóbal Road, 1,800 meters, *Stork 2560*. Cantón de Alfaro Ruiz; Finca Guayabillos; Cerro Gallito; at 2,275 meters or less. Panama. A tree of 6 meters, the branchlets glabrous; leaves slender-petiolate, rigid-membranaceous, elliptic or oblong-elliptic, 5–8 cm. long and 2–4 cm. wide, acute or short-acuminate, acute at the base, entire, glabrous, densely and minutely punctate; inflorescences axillary, bipinnate-paniculate, long-pedunculate, many-flowered, the flowers umbellate, the pedicels 3–8 mm. long; corolla 5 mm. long, lepidote-puberulent. Austin Smith furnishes the following notes regarding the tree: Bark slightly scaly and obscure, light brown, the cambium layer deep ox-blood red; fruit and flower buds pink to pale crimson;

fruit when ripe intense black, of the color, form, and size of old-fashioned shoe buttons; buds of unopened flowers creamy yellow to pink.

RAPANEA Aubl.

Shrubs or small trees, glabrous or pubescent; leaves mostly entire, usually more or less lepidote; flowers very small, 4–5-parted, densely clustered in the leaf axils, sessile; sepals free or short-connate, imbricate or valvate; petals more or less connate; anthers sessile, introrsely birimose; fruit globose, small, dry or somewhat fleshy.—Probably no other species occur in Central America. The genus is easily recognized by the small, dense clusters of sessile flowers in the leaf axils.

Rapanea ferruginea (Ruiz & Pavón) Mez. *Ratón, Ratoncillo, Ratoncillo blanco.* Frequent in forests at middle elevations, mostly at 1,000–1,500 meters; region of San Ramón. Mexico to Chile and Argentina. A shrub or small tree, 3–7.5 meters high, densely branched, the young branches densely tomentulose or villosulous; leaves short-petiolate, oblong-oblanceolate, mostly 5–8 cm. long, acute, attenuate to the base, glabrous or nearly so, entire; inflorescences 3–9-flowered, the flowers 2–3.5 mm. long; fruits small, black. A tree or shrub of inconspicuous appearance, somewhat resembling a species of *Myrica* in habit and foliage.

Rapanea guyanensis Aubl. In forest, mountains of the region of Dota, about 1,800 meters. Florida and Mexico to Bolivia and southern Brazil. A shrub or small tree, about 6 meters high, glabrous throughout; leaves short-petiolate, oblong-elliptic to oblong-obovate, mostly 7–8 cm. long, very thick, lustrous, rounded and often emarginate at the apex, acute at the base, the lateral nerves obscure or obsolete; flowers 2–2.5 mm. long.

Rapanea pellucido-punctata (Oerst.) Mez, Pflanzenreich IV. 236: 393. 1902. *Ratoncillo, Sierra. Myrsine pellucido-punctata* Oerst. Vid. Medd. Kjoebenhavn 133. 1861. Type material collected by Oersted at Jarís and Aguacate, and on Volcán de Irazú (photo. and fragment of type in Herb. Field Mus.). Occasional in forests and thickets of the Pacific slope, at middle and low elevations; Guanacaste; region of San Ramón; mostly at 1,200 meters or less. Panama. A shrub or tree of 3–6 meters, glabrous throughout; leaves short-petiolate, coriaceous and lustrous, bright green when dried, oblong to elliptic or oblanceolate-oblong, mostly 7–10 cm. long, acute or obtuse, narrowed to the base; flowers 1.5 mm. long.

Pittier reports the indigenous names Kag-dshi-krá (Brunka) and Kirba-gró (Térraba).

Rapanea Pittieri Mez, Pflanzenreich IV. 236: 378. 1902. Volcán de Irazú, 3,000 meters, *Pittier 14111*. Upper slopes of Irazú, Poás, and Cerro de Las Vueltas, at 2,700–3,000 meters. Endemic. A shrub of 3–4.5 meters, the branchlets ferruginous-tomentulose at the apex; leaves short-petiolate, obovate or obovate-elliptic, about 2 cm. long, rounded or subemarginate at the apex, cuneately narrowed at the base, coriaceous, glabrous, at least in age; flowers 3–4 mm. long, yellow-green. Easily recognized by the very small leaves. The shrub is abundant on the upper slopes of the mountains indicated.

STYLOGYNE A. DC.

Glabrous shrubs; leaves alternate, thick and coriaceous; flowers 4–5-parted, paniculate, the panicles terminal or axillary, the flowers umbellate or umbellate-corymbose; sepals dextrorsely contorted, free or nearly so; petals short-connate, dextrorsely contorted, usually lineolate; filaments filiform, the anthers elongate; fruit drupaceous, 1-seeded.—A few other species have been recorded from Central America.

Stylogyne laevis (Oerst.) Mez, Pflanzenreich IV. 236: 268. 1902. *Ardisia laevis* Oerst. Vid. Medd. Kjoebenhavn 125. 1861. *Tinus laevis* Kuntze, Rev. Gen. 2: 974. 1891. Volcán de Irazú, *Oersted 28*. Panama to southern Mexico. A glabrous shrub; leaves short-petiolate, elliptic to elliptic-oblong or oblong-obovate, 10–15 cm. long, acute or short-acuminate, acute or attenuate at the base, entire; inflorescence terminal, tripinnate-paniculate, the flowers corymbose, the slender pedicels about 6 mm. long, the flowers 4 mm. long, the petals white; sepals brown-punctate; fruit black-purple, globose, 5 mm. in diameter. From Costa Rica I have seen only a photograph of the type, which must have been collected at a rather high elevation on Irazú. Considering the region from which it came, it seems rather doubtful that the plant of the Panama lowlands referred here is really conspecific, but this can scarcely be decided without examination of the type material. In Panama this species is called Uvito.

Stylogyne ramiflora (Oerst.) Mez. *Guastomate*. In forests of the Pacific tierra caliente, reported from Boruca, Nicoya, San Mateo, Puntarenas, etc. Panama to Guatemala. A shrub of 1–2

meters, similar in most characters to the preceding species; leaves often somewhat larger, and as much as 20 cm. long; inflorescences lateral or axillary, bipinnate-paniculate, the flowers subcorymbose, the pedicels seldom more than 5 mm. long; flowers 4 mm. long, the petals white or pink; fruit purple-black, 5 mm. in diameter. The ripe fruits are edible, and have a rather pleasant flavor. Pittier reports the Térraba name as Kuetán-gró.

THEOPHRASTACEAE

Reference: Mez, Pflanzenreich IV. 236a. 1903.

Shrubs or small trees; leaves opposite, often clustered at the ends of the branches and pseudoverticillate, simple, entire or spinose-serrate, often spine-tipped, without stipules; inflorescences terminal or axillary, racemose or rarely reduced to a single flower, the flowers perfect or dioecious, often showy, usually yellow or orange, normally 5-parted, regular; calyx inferior, the segments free or short-connate, often crenate, imbricate or contorted, persistent, neither punctate nor glandular; corolla gamopetalous, rotate, urceolate, or funnelform, the segments imbricate or contorted; fertile stamens as many as the corolla lobes and opposite them, the filaments more or less connate, the anthers dorsifixed, opening by extrorse slits; sterile stamens or staminodia 5, inserted on the corolla; ovary gradually narrowed to a stout, short or elongate style, the stigma discoid or conic, the ovules numerous; fruit baccate or drupaceous, indehiscent; seeds numerous or few, immersed in the pulp.—One other genus, *Deherainia*, is represented in northern Central America.

CLAVIJA Ruiz & Pavón

Shrubs or small trees, often unbranched, the trunk sometimes furnished with spinose scales; leaves usually clustered at the ends of the stem or branches, petiolate, narrow, entire or spinose-dentate; flowers small, in axillary racemes, polygamo-dioecious; staminodia glandlike; seeds few.—One other species is reported from Central America.

Clavija Biborrana Oerst. Vid. Medd. Kjoebenhavn 117. 1861. *Viborrana*. *Theophrasta Biborrana* Kuntze, Rev. Gen. 2: 404. 1891. Mt. Jarís, 1,000 meters, *Oersted 31A* (photo. seen of the type, Herb. Copenhagen). Known only from the original collection. A shrub; leaves on short or elongate petioles, lance-oblong, 15–20 cm. long, about 2 cm. wide, long-acuminate, attenuate to the base; racemes few-flowered, the pedicels 3 mm. long or less, bracteate at the base;

flowers small, about 5 mm. broad, the sepals rounded, fimbriate-crenulate; petals suborbicular, minutely crenulate.

Clavija costaricana Pittier, Contr. U. S. Nat. Herb. 20: 131. 1918. Forest of Río Hondo, Plains of Santa Clara, 100 meters, *Cook & Doyle 551*. Also Guápiles, and mountains of Guanacaste, at 700 meters or less, growing in humid forest. Endemic. A usually simple shrub about 3 meters high, glabrous throughout; leaves stiff, on short, thick petioles, obovate-oblong or narrowly obovate-elliptic, 30–50 cm. long, 10–15 cm. wide, often rounded and abruptly short-acuminate at the apex, long-attenuate to the base; staminate racemes short or elongate, few- or many-flowered, the pedicels 2–3 mm. long; corolla greenish yellow, more than 1 cm. broad; fruit large, globose, shining.

JACQUINIA L.

Shrubs or small trees, usually glabrous; leaves coriaceous and usually rigid, often spine-tipped, entire; flowers perfect, 5-parted, yellow or orange, in usually terminal racemes; sepals free or very shortly connate, broad, rounded at the apex, ciliate or crenulate; petals connate, the lobes spreading, rounded; staminodia 5, petaloid, inserted high on the corolla tube; fruit globose or ovoid, few-seeded, with a hard, thick wall.—Several other species occur in Central America. In various regions of tropical America plants of this genus are used as barbascos or fish poisons. The rather stiff and almost dry corollas last for a long time, and in some places they are strung on thread for use as decorations. The spines terminating the leaves are stiff and sharp, and penetrate the flesh readily.

Jacquinia angustifolia Oerst. Vid. Medd. Kjoebenhavn 119. 1861. *Siempreviva*. Santa Rosa, Guanacaste, *Oersted* (photo. seen of the type, in Herb. Copenhagen). Reported also from Mexico. Young branches densely pubescent; leaves short-petiolate, linear-oblong, about 4.5 cm. long and 1 cm. wide, rounded or acute and mucronate at the apex, the terminal spine as much as 4 mm. long; racemes about 8-flowered, the rachis geniculate, the pedicels about 8 mm. long; fruit 1 cm. in diameter, subglobose, mammillate at the apex.

Jacquinia macrocarpa Cav. *Siempreviva, Burriquita*. Thickets of the lowlands of Guanacaste. Panama. A densely branched shrub or small tree, 1.5–4 meters high, the branchlets pubescent; leaves on very short petioles, elliptic-lanceolate or obovate-oblong,

mostly 1–2 cm. wide, acute to rounded at the apex and pungent-mucronate, attenuate to the base; racemes few-flowered, pubescent, the pedicels 6 mm. long or more; flowers orange-colored, 13 mm. long. The plant is reported to be in use in Guanacaste as a barbasco. It would be expected that the species found commonly in that province would be *J. angustifolia*, but the type of that has much narrower leaves than the specimens I have seen. Costa Rican collections have been referred to *J. aurantiaca* Ait., which may be synonymous with *J. macrocarpa*. In spite of Mez's monographic account of this genus, the specific limits are poorly understood, and until much ampler flowering material has been collected, it will be impossible to decide how many species, and which ones, are really represented in Central America. It is probable that the number of recognized species will be reduced rather than increased.

PRIMULACEAE. Primrose Family

Reference: Pax & Knuth, Pflanzenreich IV. 237. 1905.

Perennial or annual herbs; leaves without stipules, alternate, opposite, or verticillate, sometimes all basal, simple or lobate; flowers symmetric, perfect, often dimorphous, generally 5-parted; calyx persistent; corolla gamopetalous, with a short or elongate tube, the lobes imbricate; stamens epipetalous; ovary superior, 1-celled, the placenta central, free, the ovules numerous; fruit capsular.—The genus *Samolus* is represented in northern Central America.

ANAGALLIS L.

Small, simple or branched herbs; leaves opposite or alternate, sessile or short-petiolate, entire; flowers axillary, pedicellate, red, blue, or white; calyx 5-parted almost to the base into narrow segments; corolla rotate, the tube very short; stamens 5; capsule globose, circumscissile.—*Anagallis arvensis* L., a European species, is naturalized in Guatemala.

Anagallis pumila Swartz. *Centunculus pentandrus* R. Br. Frequent in grassy places, often in pastures, Pacific slope, from almost sea level to about 1,500 meters; Dota; region of San Ramón. Widely distributed in tropical and subtropical regions of both hemispheres. Plants very slender, annual, glabrous, simple or branched, prostrate or ascending, the stems 2–12 cm. long; leaves alternate, ovate, acute, sessile, the lowest often opposite, mostly about 4 mm. long; flowers minute, white. The Costa Rican

material is referable to the most widely distributed variety, *longipedunculata* Chod. & Hassl., in which the slender pedicels are about as long as the leaves.

PLUMBAGINACEAE. Plumbago Family

In North America the family is represented by a single genus.

PLUMBAGO L.

Plants perennial, herbaceous or suffrutescent, sometimes scandent; leaves alternate, sessile or short-petiolate, entire; flowers mostly blue or white, in bracteate racemes, perfect, regular; calyx tubular, 5-costate, glandular, 4–5-dentate; petals 4 or 5, unguiculate, the claws united to form a tube, the corolla salverform; stamens 5, distinct, the filaments dilated at the base, the anthers linear; disk none; ovary superior, 1-celled, the ovule solitary, the styles 5, filiform; fruit capsular, enclosed in the calyx.—No other species are known from Central America.

Plumbago capensis Thunb. A native of South Africa, often grown for ornament. Plants somewhat woody, often more or less scandent; flowers large and showy, blue or white.

Plumbago scandens L. *Mielilla.* Occasional about San José and in the tierra caliente of both slopes, but uncommon or rare, growing in thickets or waste ground. Widely distributed in tropical America. Plants erect or somewhat clambering, often suffrutescent at the base; leaves ovate or lanceolate, 3–10 cm. long, acute or acuminate, narrowed at the base to a short petiole or sessile, glabrous; spikes short or greatly elongate, many-flowered; calyx 1 cm. long, covered with stipitate, very viscid glands; corolla white, the slender tube as much as 2 cm. long.

SAPOTACEAE. Sapodilla Family

References: Standley, An enumeration of the Sapotaceae of Central America, Trop. Woods 4: 1. 1925; Additions to the Sapotaceae of Central America, op. cit. 31: 38. 1932.

Trees or rarely shrubs, usually with a milky latex, sometimes armed with spines; leaves alternate, petiolate, entire, without stipules; flowers perfect or polygamous, usually fasciculate in the leaf axils, regular, symmetric; sepals 4–12, imbricate; corolla gamopetalous, often with interior appendages between the lobes; stamens as many as the corolla lobes, often alternating with staminodia, the filaments distinct; ovary superior, sessile, 4–12-celled, the styles united, the

ovules solitary in each cell, anatropous; fruit baccate, often very large, containing 1 to several seeds; seeds lustrous, usually smooth. —The genus *Labatia* also is represented in Central America, and probably in Costa Rica. The family is an important one economically, because of the edible fruits of many species, and the products obtained from the latex. It is less abundantly represented in Costa Rica than in northern Central America. Herbarium material now available from Central America is inadequate for intelligent understanding of the species, and it is highly desirable that collectors should obtain ample material of these trees wherever found.

ACHRAS L.

Large, unarmed trees; leaves coriaceous, mostly clustered near the ends of the branches, petiolate; flowers rather large, mostly 6-parted, whitish, solitary or fasciculate in the leaf axils; sepals biseriate; corolla urceolate to subrotate, scarcely longer than the calyx; anthers sagittate; staminodia almost equaling the corolla lobes; ovary 10–12-celled; fruit a large, brownish, rough-skinned berry.—One other species is known in northern Central America.

Achras calcicola Pittier. Region of San Ramón, collected only by Brenes. Panama. A deciduous tree of 15–25 meters, the trunk as much as 1 meter in diameter, the bark rimose, the crown small, depressed; wood hard, reddish; leaves coriaceous, glabrous, petiolate, obovate-oblong, 8–18 cm. long, 3–6 cm. wide, obtuse-acuminate, cuneate at the base, deep green above, much paler beneath; pedicels pubescent, 1 cm. long; sepals 6, about 6 mm. long, tomentulose; corolla white, broadly campanulate or subrotate, glabrous, 6-lobate, the tube 1 mm. long, the lobes acute, 3.5–4 mm. long; stamens and staminodia each 6. Called Níspero in Panama.

Achras Zapota L. *Níspero.* Occasional in forests of the tierra caliente, where apparently native in some places; Guanacaste; often planted in the tierra caliente and occasionally in the tierra templada. Native of the Yucatan Peninsula and adjoining regions, and perhaps throughout much of the Central American tierra caliente. A tall tree, variable in form according to the place of growth, in cultivation usually with a broad and very dense crown of handsome foliage, the bark dark brown, the young branches pubescent; leaves oblong-obovate to oblong or elliptic, 6–12 cm. long, obtuse, obtuse or acute at the base, glabrous or nearly so; pedicels about as long as the short petioles, brownish-pubescent; sepals 8–10 mm. long, brownish-pubescent; corolla glabrous, whitish,

8 mm. long; fruit globose or ovoid, 3–8 cm. in diameter, rough and brownish, the flesh very sweet, somewhat brownish; seeds several, compressed, 2 cm. long. The wood is dark red, very hard, heavy, tough, strong, fine-textured, finishes smoothly, and is durable. It is used in Central America for many purposes, especially heavy, permanent construction, and for tool handles. Its durability is attested by the fact that beams of sapodilla wood have lasted for centuries in some of the ancient Maya ruins.

The sweet fruit has an agreeable flavor and is much eaten. Many foreigners consider it the best of all Central American fruits. The most important product of the tree is chicle gum, obtained from the latex, which exudes when the bark is cut. Chicle, for use in manufacture of chewing gum, is exported in vast amounts from Petén, Guatemala, British Honduras, and the adjoining regions. Although the trees are often found in apparently primeval forest in southern Central America, there is some doubt as to whether they are truly native there, or rather relics of ancient cultivation. Pittier reports the Bribrí name of Korób.

BUMELIA Swartz

Trees or shrubs, the branches often armed with spines; leaves rather small, more or less coriaceous; flowers small, pedicellate, fasciculate in the leaf axils, white or greenish; sepals 5, unequal; corolla 5-lobate, with a pair of lobelike appendages in each sinus, the tube short; stamens 5, the 5 staminodia petaloid; ovary 5-celled; fruit small, containing a single seed.—Several other species are known from Central America.

Bumelia Austin-Smithii Standl., sp. nov. *Corpus espina.*—Arbor, ramulis crassiusculis subteretibus, vetustioribus fuscis rimosis, novellis brunnescentibus primo sparse sericeis cito glabratis, ramulis spinis paucis crassis vix ultra 7 mm. longis armatis; folia parva breviter petiolata coriacea, petiolo crassiusculo 5–6 mm. longo sparse sericeo vel glabro; lamina oblonga vel lanceolato-oblonga, rare latior, 6.5–9 cm. longa 2.5–4 cm. lata, apice late vel anguste rotundata, interdum tantum obtusa, basi plus minusve inaequali abrupte breviter acutata, in sicco olivacea vel subfusca, lucida, glabra, costa gracili subtus prominente, nervis lateralibus utroque latere ca. 8 angulo lato fere recto abeuntibus fere rectis remote a margine arcuato-conjunctis, aliis fere aequicrassis parallelis brevioribis interpositis; flores in axillis fasciculati, pauci vel numerosi, pedicellis crassiusculis 2–3 mm. longis vel paullo ultra glabris;

sepala paullo inaequalia 4 mm. longa late elliptico-ovata acutiuscula glabra vel glabrata; corolla calyce paullo longior extus glabra, lobis late obovatis apice rotundatis ciliolatis, appendicibus angustis laciniato-dentatis.—Zarcero, Prov. Alajuela, 2,010 meters, *Austin Smith 4163* (type in Herb. Field Mus.); also *Nos. 4229* and *H610* from the same locality. Concerning the tree the collector supplies the following notes: Growing in pastures or on hilltops, quite common in some places, but never very tall; trees 7–11 meters high, the base of the trunk as much as 1.2 meters in diameter, often dividing into a number of trunks, these again much branched. All branches amply armed with spines, the spines on the trunk often branched. Bark neutral dark gray or light brown, somewhat roughened, emitting a milky sap which is sticky and difficult to remove from objects with which it comes in contact. Main trunk often very gnarled, the bark flocculent or peeling off in small pieces. Leaves lustrous on the upper surface. Flowers white. Wood about the hardest known in this region.

Bumelia Lankesteri Standl. Trop. Woods 31: 40. 1932. *Espino blanco.* Las Cóncavas, south of Cartago, *Lankester 1258.* Known only from the region of the type. A tree of 8–10 meters, densely branched, armed with a few stout spines, the young branches sericeous; leaves short-petiolate, subcoriaceous, broadly oblong or elliptic-oblong, 4.5–7.5 cm. long, 3–3.5 cm. wide, broadly rounded at the apex, obtuse or subacute at the base, almost glabrous; pedicels 3–4 mm. long; sepals 3 mm. long, the outer ones glabrous or glabrate, the inner sericeous; corolla glabrous, 3 mm. long; fruit subglobose, 12 mm. long.

Bumelia panamensis Standl. Pacific coast, especially in Guanacaste, at 700 meters or less. Panama. A tree, 5–25 meters high, the trunk as much as 60 cm. in diameter, the branches armed with stout spines, the young branches brownish-sericeous; leaves on slender petioles 4–6 mm. long, lance-oblong or elliptic-oblong, 5–7 cm. long, 2–3 cm. wide, acute or acuminate, acute at the base, sparsely sericeous when young but soon glabrate; pedicels 3 mm. long; sepals oval, 2.5–3.5 mm. long, finely sericeous; corolla 4.5 mm. long. Called Limoncillo in Panama. In Guanacaste the tree was noted as being sometimes an epiphytic strangler.

CALOCARPUM Pierre

Large, unarmed trees, the leaves large, rather thin, mostly clustered near the ends of the branches; flowers small, whitish,

mostly fasciculate on naked branches below the leaves; sepals about 10, densely imbricate in several series; corolla sericeous, 5-lobate, the lobes longer than the tube; staminodia 5, sometimes antheriferous; stamens 5, opposite the corolla lobes, the filaments subulate, the anthers cordate; ovary 5-celled; fruit very large, 1-seeded.—The genus consists of only the following species.

Calocarpum mammosum (L.) Pierre. *Zapote, Zapotillo. Lucuma mammosa* A. DC. Occasional in forests of the tierra caliente; often cultivated at middle and low elevations. Native probably of southern Mexico and of Central America, now widely planted in tropical regions. A large tree; leaves obovate or oblong-obovate, short-petiolate, 15–25 cm. long, acute or short-acuminate, attenuate to the base, conspicuously veined, puberulent or glabrate beneath; flowers usually densely fasciculate and almost sessile; sepals rounded, sericeous, 3 mm. long; corolla 10 mm. long; fruit globose or ellipsoid, as large as a large orange, brown and rough, the flesh yellow, very sweet. The wood is light brown or buff, moderately hard, strong, medium-textured, easy to work, and fairly durable. Where available, it is employed for house frames and many other purposes. The fruit is greatly esteemed throughout Central America, but it is rather too sweet and insipid for a northern palate. From the seeds, known as *zapoyoles*, is obtained an oil used in domestic medicine in Costa Rica as a remedy for colds. It is stated that the handsome, large, very lustrous, brown seeds were employed in former times in Costa Rica for ironing linen. Indian names reported by Pittier are: Bekó (Cabécara), Kurók (Bribrí), Kom-krá (Brunka), Fiú (Térraba).

Calocarpum viride Pittier. *Zapote, Zapote blanco.* Regions of Tilarán and San Ramón, 500–750 meters. Panama to Guatemala. A tall tree, the trunk 40–60 cm. in diameter; similar in general appearance to *C. mammosum*, but with small fruits, only 9–10 cm. long, having a thin, green, smooth skin, and with whitish-hairy or glabrate petioles; in *C. mammosum* the fruits have a thick, rough, brown skin, and the petioles usually are densely brown-hairy. Called Ingerto or Zapote ingerto in Salvador and Guatemala. The latex is one of the sources of chicle gum in northern Central America. The tree is said to be planted in some places about San José.

CHRYSOPHYLLUM L. Star-apple

Large or medium-sized trees, unarmed, evergreen; leaves somewhat coriaceous, often densely sericeous beneath; flowers small,

5-parted, fasciculate in the leaf axils or at defoliate nodes; sepals almost equal; corolla lobes not appendaged; stamens included in the corolla; staminodia none; ovary sericeous; fruit a large or small berry, containing 1 or several seeds.—At least one other species is known from Central America.

Chrysophyllum argenteum Jacq. *Caimito cimarrón.* Region of San Ramón, and elsewhere on the Pacific slope, at 1,100 meters or less. Panama; West Indies. A tree of 5–10 meters; leaves short-petiolate, rather thin, elliptic to oblong, mostly 5–10 cm. long, acuminate, acute at the base, glabrous above, thinly silvery-sericeous beneath or glabrate; calyx about 2 mm. long; corolla 3–4 mm. long, sparsely sericeous; fruit ellipsoid or subglobose, 8–14 mm. long, 1-seeded. It is possible that the continental tree may represent a species distinct from the one found in the Antilles, but I find no good characters for separating it.

Chrysophyllum Cainito L. *Caimito.* Planted frequently in the tierra caliente, also in the tierra templada, but said not to fruit at higher elevations. Probably native in the West Indies, but widely cultivated in tropical America. A handsome tree with spreading crown, the trunk as much as 60 cm. in diameter; leaves elliptic or oblong-elliptic, covered beneath with a very dense coat of silky, golden or brown hairs, abruptly acute or obtuse, obtuse at the base; corolla 3.5–5 mm. long; fruit globose or ellipsoid, 5–8 cm. in diameter, greenish or purple, containing several compressed seeds. The fruit is somewhat milky when cut, and is sweet and rather viscid; it is much liked by many people. When cut transversely, the seeds are seen radiating like the points of a star, hence the usual English name. The wood is brown or reddish, hard, heavy, strong, medium-textured, not difficult to work, and fairly durable. It is employed sometimes for heavy construction. An infusion of the bark is said to be used in Costa Rica as a tonic. Pittier states that the tree grows in the tierra caliente of both coasts, but this statement probably is based upon confusion with other species. I have seen *C. Cainito* in Central America only in cultivation.

Chrysophyllum panamense Pittier. Occasional in forests of the Atlantic tierra caliente. Panama. A large or medium-sized tree with rounded crown, the bark grayish, smooth; young branches brownish-sericeous; leaves short-petiolate, rather thin, elliptic or oblong-elliptic, mostly 10–20 cm. long, 4–8 cm. wide, abruptly acuminate, acute or obtuse at the base, glabrous above, densely

brownish-sericeous or glabrate beneath; pedicels about 6 mm. long; sepals sericeous, 1.5 mm. long; corolla greenish yellow, almost 5 mm. long, sericeous; fruit 1-seeded.

DIPHOLIS A. DC.

Unarmed trees; leaves petiolate, small or rather large, coriaceous; flowers small, mostly 5-parted, fasciculate in the leaf axils or at defoliate nodes; sepals imbricate; corolla rotate or funnelform, with 2 appendages in each sinus; stamens borne on the corolla tube opposite the lobes, exserted; staminodia 5, often petal-like; ovary 5-celled; fruit small, usually 1-seeded.—At least three other species occur in Central America. Their wood is brown or reddish, hard, heavy, tough, and medium-textured. It is little if at all utilized.

Dipholis minutiflora Pittier, Contr. U. S. Nat. Herb. 13: 464. *f. 90.* 1912. *Tempisque, Nispero amarillo.* Forests of El Copey, 1,800 meters, *Tonduz 11935.* Mountains of Dota and Guanacaste, at 600–1,800 meters. Perhaps also in Honduras. A tree of 9–25 meters with reddish bark; young branchlets tomentulose; leaves petiolate, coriaceous, obovate or oblong, 4–8 cm. long, obtuse or broadly rounded at the apex, obtuse or acutish at the base, glabrous or nearly so; flowers mostly at defoliate nodes, the pedicels 5–7 mm. long; sepals 2 mm. long; corolla white, almost 2 mm. long; fruit purple or yellow, about 3 cm. long and 2 cm. thick or smaller; seed subglobose, dark brown, 1.5 cm. in diameter. The tree is rather common in the mountains about Tilarán.

Dipholis parvifolia Standl., sp. nov.—Arbor mediocris vel alta, ramulis dense foliatis gracilibus striatis ochraceis glabris vel glabratis, internodiis brevibus; folia parva petiolata coriacea, petiolo crassiusculo 6–7 mm. longo glabro; lamina anguste elliptico-oblonga vel lanceolato-oblonga 3–4 cm. longa 8–10 mm. lata longe anguste attenuato-acuminata, acumine ipso obtuso, basi acuta vel attenuato-acuminata, glabra, costa subtus prominente gracillima, nervis lateralibus utroque latere ca. 7 angulo semirecto vel angustiore adscendentibus, venulis vix prominulis arcte reticulatis pallidis; fructus (unus delapsus tantum visus) obovoideo-globosus ca. 1.5 cm. longus et fere aequilatus apice late rotundatus glaber; sepala 6, exteriora breviora, usque 3.5 mm. longa, apice late rotundata, sparse sericea vel glabrata.—Los Ayotes, near Tilarán, Prov. Guanacaste, 600–700 meters, *Standley & Valerio 45525* (type in U. S. National Herbarium). Los Ayotes, near Tilarán, 600 meters, *Standley & Valerio 45347.* Moist forest, Quebrada Serena, near

Tilarán, 700 meters, *Standley & Valerio 46173*. Known only from fruiting or sterile material, the generic position of this tree must remain doubtful for the present. The general appearance of the specimens seems to indicate a relationship with *Dipholis*.

LUCUMA Molina

Small or large trees, unarmed; leaves mostly coriaceous, small or large, petiolate; flowers small, fasciculate in the leaf axils or at defoliate nodes; sepals 4 or 5, much imbricate; corolla urceolate, with a short, broad tube; stamens 4–6, inserted on the corolla opposite the lobes, the filaments thick or slender; staminodia linear or filamentous, inserted in the sinuses of the corolla; ovary 2–6-celled, usually pilose; fruit small or large, with 1–5 seeds.—A large number of other species are known from Central America, and several others described from Panama may well be expected in Costa Rica.

Lucuma campechiana HBK. *Zapotillo.* In cultivation at San Francisco de Guadalupe, near San José, and perhaps elsewhere. Extending to southern Mexico. A medium-sized tree, the young branches brownish-sericeous; leaves short-petiolate, large, rather thin, mostly oblong or lance-oblong and 12–16 cm. long or larger, acuminate to subacute, acute or acuminate at the base, glabrous or nearly so; pedicels often as long as the petioles, the flowers 5 mm. long; sepals 5; corolla glabrous.

Lucuma lucentifolia Standl. Field Mus. Bot. 4: 251. 1929. *Matasano* (fide Oersted). Talamanca Valley, *G. P. Cooper 13*. Collected by Oersted at Turrialba. Panama. A tree of 11 meters with milky latex, the trunk 25 cm. in diameter, the branchlets glabrous; leaves short-petiolate, rather thin, obovate-oblong or elliptic-oblong, 13–25 cm. long, 4–10 cm. wide, abruptly short-acuminate, attenuate to the base, glabrous, very lustrous on the upper surface; fruit subglobose, subsessile, 5 cm. in diameter, glabrous; seeds 5, compressed, suborbicular, brown and lustrous, 2.5 cm. long. The fruit is said to be edible, with juicy pulp and golden brown skin.

Lucuma obovata HBK. *Mamón.* Cultivated at San José. Native of Peru and Chile. A tree of 8–10 meters, with a very dense, rounded crown, the bark rugose, grayish; branchlets minutely sericeous; leaves clustered at the ends of the branches, on petioles 1–2 cm. long, elliptic-ovate or obovate, 8–12 cm. long, 4–5 cm.

wide, rounded or very obtuse at the apex, acute at the base, glabrous or nearly so; pedicels 10–12 mm. long, glabrate; sepals 5, about 10 mm. long, sericeous; corolla 13 mm. long, minutely sericeous; fruit ovoid or depressed-globose, as large as a medium-sized apple, green and smooth, the flesh yellow, mealy; seeds 1–5, usually 2, subglobose, as large as a chestnut.

MANILKARA Rheede

Large trees with milky latex; leaves rather large, coriaceous; flowers axillary or on defoliate nodes; sepals 6–12, biseriate; corolla 18–24-lobate, with a short tube; stamens borne on the corolla tube, the filaments short, the anthers lanceolate; staminodia petal-like, dentate or lacerate; ovary pilose, 6–12-celled; fruit with 1–8 compressed seeds.—One other Central American species is known, in Panama.

Manilkara spectabilis (Pittier) Standl. Trop. Woods 31: 45. 1932. *Níspero. Mimusops spectabilis* Pittier, Contr. U. S. Nat. Herb. 13: 465. 1912. Piuta, near Limón, at sea level, *Pittier 16012*. Known only from the original material. A large tree, the straight trunk as much as 40 meters high, the bark dark brown, the crown broad, depressed; leaves coriaceous, glabrous, clustered at the ends of the branches, the petioles 2.5–3.5 cm. long; blades elliptic-oblong, 12–15 cm. long, 5–6 cm. wide, obtuse or subacute, cuneate-rounded at the base; flowers 1–3-fasciculate in the leaf axils, the pedicels 8–12 mm. long, tomentose; sepals 6, ovate or ovate-oblong, 6–7 mm. long, tomentose; corolla 7 mm. long; ovary 10-celled. The wood is hard, heavy, dark, and durable. It is utilized locally for railroad ties. South American species of *Manilkara* furnish the well known balata gum of commerce.

SIDEROXYLON L.

Unarmed trees; leaves coriaceous, usually long-petiolate; flowers small, 5-parted, greenish yellow or white, fasciculate in the leaf axils or at defoliate nodes; sepals obtuse, imbricate; corolla subrotate, the lobes obtuse, not appendaged; stamens inserted at the middle or top of the corolla tube opposite the lobes, included, the filaments slender; staminodia entire or dentate; ovary usually 5-celled; fruit ovoid or subglobose, commonly 1-seeded.—Several other species are known from Central America.

Sideroxylon Capiri (A. DC.) Pittier. Irazú, collected by Oersted. Panama to Mexico. A large tree with spreading crown,

the bark reddish brown or brownish yellow, the young branches tomentulose; petioles slender, often as long as the blades; leaf blades ovate to oval or oblong, 7–15 cm. long, acute to rounded at the apex, rounded or obtuse at the base, brownish-pubescent when young but soon glabrate; pedicels 10–12 mm. long, mostly at defoliate nodes, pubescent; sepals 4 mm. long; fruit ovoid, globose, or ellipsoid, 3–3.5 cm. long, containing 1 or more seeds. The sweet fruit is eaten either raw or cooked. The specific name is derived from one of the Mexican names of the tree.

Sideroxylon Tempisque Pittier. *Tempisque.* Forests of Guanacaste, often growing along streams. Ranging to southern Mexico. A tree of 12–18 meters, similar to the preceding species; petioles and pedicels glabrous; pedicels 5–6 mm. long; corolla 7–8 mm. long; fruit ovoid or ellipsoid, 3–4 cm. long, 1-seeded.

Sideroxylon uniloculare Donn. Smith, Bot. Gaz. 35: 5. 1903. Río de Las Vueltas, Tucurrique, 635 meters, *Tonduz 13358*. Petioles 8–15 mm. long; leaf blades oblong-elliptic or obovate-elliptic, 13–20 cm. long, 6–9 cm. wide, cuspidate-acuminate, cuneate at the base, glabrous; pedicels 7 mm. long, ferruginous-pubescent; sepals 5, about 2 mm. long, ferruginous-pubescent; corolla glabrous, the lobes twice as long as the tube, orbicular; ovary pubescent. The reference of this tree to the genus *Sideroxylon* is questionable.

EBENACEAE. Ebony Family

The family is represented in North America by a single genus.

DIOSPYROS L.

Trees or shrubs; leaves alternate, petiolate, entire, without stipules; flowers dioecious, axillary, mostly solitary or fasciculate, small, regular; calyx inferior, 3–6-lobate; corolla gamopetalous, 3–6-lobate, campanulate, urceolate, or tubular, the lobes convolute; stamens inserted on the corolla tube, 2–3 times as many as the corolla lobes, the anthers erect, dehiscent introrsely; ovary superior, 3–6-celled; styles 2–6; fruit a small or large berry, containing 12 or fewer large, compressed seeds.—A few other species are known from Central America. As here treated, the genus includes those species often referred to a separate genus, *Maba*, which seems to possess no constant generic differences. The ripe fruits of many species are sweet and edible. The unripe fruits usually are extremely astringent. The heartwood is gray to black, usually streaked, very hard, tough, strong, easy to work; the sapwood is

suitable for tool handles, the heartwood for articles of turnery and small cabinetwork. The very black wood of some species is the ebony of commerce. The name Persimmon is applied to the species found in the United States. The Japanese persimmon, with very large, handsome fruits, is much cultivated in eastern Asia and to some extent in America.

Diospyros ebenaster Retz. Collected only at Tilarán, in rather dry forest. Extending to Mexico and West Indies. A tree of 9–12 meters or more, the bark almost black; leaves short-petiolate, coriaceous, elliptic to elliptic-obovate, 6–15 cm. long, obtuse or rounded at the apex, acute at the base, glabrous; peduncles 1–2.5 cm. long; flowers whitish, fragrant; fruiting calyx usually 4-lobate; fruit depressed-globose, 3 cm. or more in diameter. In Mexico and elsewhere this species is sometimes cultivated for its edible fruit, which has black pulp of most repulsive appearance when fully ripe. The fruits of the trees at Tilarán were too bitter to be eaten. There is some question as to the region in which this species is native, and it has been ascribed even to the Philippines, where, however, it is believed to be introduced. The Tilarán trees had every appearance of being native, and the tree has been found elsewhere in Central America in recent years, growing apparently in a wild state.

Diospyros nicaraguensis Standl. *Maba nicaraguensis* Standl. Between Bagaces and Cañas, Guanacaste, *Brenes 15605*. Nicaragua. A shrub or small tree; leaves short-petiolate, obovate-oblong or oblanceolate-oblong, mostly 4–7 cm. long and 1–2.5 cm. wide, obtuse or rounded at the apex, attenuate to the acute or obtuse base, densely short-pilose on both surfaces or glabrate above; peduncles only 1–4 mm. long; calyx 3–5-lobate, 8–10 mm. long; pistillate corolla urceolate, sericeous, the tube 8 mm. long, the 4 lobes 3 mm. long; ovary densely pilose.

STYRACACEAE. Storax Family

Reference: J. Perkins, Pflanzenreich IV. 241. 1907.

In Central America the family is represented by a single genus.

STYRAX L.

Shrubs or trees, lepidote or stellate-pubescent; leaves alternate, without stipules, entire or irregularly serrate; flowers perfect, regular, usually white, in simple or branched, axillary or terminal racemes; calyx cupular, inferior, truncate or shallowly dentate; corolla gamopetalous, usually 5-parted, the tube short, the lobes valvate or

imbricate, narrow, spreading; stamens 10, the filaments connate with the base of the corolla, the anthers linear, longitudinally dehiscent; ovary 3-celled or in age 1-celled, the style elongate, the stigma 3-lobate or capitate, the ovules few in each cell; fruit usually globose, dry or nearly so, indehiscent, or irregularly dehiscent by 3 valves, containing a single seed.—Probably no other species are found in Central America. In her monograph of this family Miss Perkins divided the species finely, and it is decidedly doubtful that all those reported from Costa Rica are valid.

Styrax argenteus Presl. *Resina, Bracino, Laurel, Tubús.* Frequent in forest or thickets of the Pacific slope, mostly at 700–1,500 meters; region of San Ramón. Panama to Mexico. Usually a tree of 5–6 meters, the trunk sometimes 30 cm. in diameter; leaves on rather long petioles, oblong-lanceolate or lanceolate, mostly 7–10 cm. long, rather thick, acuminate, cuneate at the base, entire, glabrous above, beneath very densely and minutely grayish- or yellowish-stellate-tomentose; inflorescence racemose, mostly 3–7-flowered; flowers white or tinged with pink, mostly 1.5–2 cm. long; calyx 4 mm. high; fruit about 1.3 cm. in diameter.

Styrax glabrescens Benth. *Bracino. S. guatemalensis* Donn. Smith. Frequent in forests of the Pacific slope, mostly at 500–1,500 meters; region south of Cartago; region of San Ramón. Extending to Mexico. A tree of 6–10 meters with a broad crown; leaves short-petiolate, membranaceous, bright green, ovate to oblong or obovate, mostly 8–15 cm. long, abruptly acuminate, often somewhat dentate, almost glabrous on both surfaces; flowers white, about 2 cm. long; fruit 1 cm. in diameter. Easily recognized among Costa Rican species because of the broad, thin, almost glabrous leaves, green on the lower surface.

Styrax polyanthus Perk. Bot. Jahrb. 31: 479. 1901. Type collected by Warscewicz, in Costa Rica or Panama. Collected several times in the region of San José. A tree, the trunk as much as 30 cm. in diameter; leaves on rather long petioles, oblong or lance-oblong, 7–13 cm. long, subcoriaceous, acute or acuminate, glabrous above, entire, densely and softly stellate-pubescent beneath with intermixed long and short, often yellowish hairs; flowers 1.5 cm. long, the calyx 4 mm. long.

Styrax polyneurus Perk. in Donn. Smith, Bot. Gaz. 35: 5. 1903. *Resina, Ascá, Aguacate ascá, Laurel.* El Copey, 1,800 meters, *Tonduz 11744* (fragment of type seen). Mountains of the

central region and region of San Ramón, at 1,000–2,000 meters. Endemic. A tree of 4–6 meters, the trunk 15 cm. in diameter; bark gray, slightly rough; leaves short-petiolate, oblong to lanceolate or obovate-lanceolate, 8–12 cm. long, acutish to subacuminate, acute at the base, entire, subcoriaceous, glabrous above, whitish or pale brownish beneath and covered with a minute, closely appressed, lepidote-stellate tomentum, the nerves and veins prominent and reticulate beneath; flowers 1 cm. long, the calyx 4 mm. high; corolla white or pink.

Styrax Warscewiczii Perk. *Quiquicirri.* Occasional in mountains of the central region, mostly at 1,500–2,250 meters. Panama. A tree of 10 meters; leaves short-petiolate, oblong, 7.5–8.5 cm. long, subcoriaceous, entire, obtuse or acute, glabrous on the upper surface, beneath yellowish-stellate-tomentose; flowers about 1.5 cm. long, white or pink, fragrant, the calyx 3 mm. high; fruit 6 mm. in diameter. It is doubtful whether this is distinct from *S. argenteus.* Medicinal properties are attributed locally to this and other species.

SYMPLOCACEAE

Reference: Brand, Pflanzenreich IV. 242. 1901.

The family consists of a single genus.

SYMPLOCOS Jacq.

Shrubs or trees; leaves alternate, entire or serrate, sessile or short-petiolate; stipules none; flowers axillary or terminal, sessile or pedunculate, solitary or fasciculate, spicate, or racemose, regular, perfect; sepals 5, more or less connate; petals 3–11, longer than the calyx, more or less connate; stamens inserted on the corolla, 4 to many, free or more or less connate, in 1–4 series, the filaments filiform or complanate, the anthers ovoid-globose; ovary inferior or semi-inferior, 2–5-celled, the ovules 2–4 in each cell, pendulous; style 1, filiform, the stigma capitellate or 3–5-lobulate; fruit baccate, cylindric or subglobose, 1–5-celled, most of the cells abortive; seeds solitary in each cell.—A few other species are known from Central America. The genus is a large one, of about 300 species, which are widely distributed in the tropics of the earth.

Symplocos Austin-Smithii Standl., sp. nov.—Arbor 18-metralis, trunco 60 cm. diam., ramulis subteretibus gracilibus, novellis sat dense pilis brevibus adpressis brunnescentibus pilosis, internodiis brevibus; folia modica breviter petiolata subcoriacea, petiolo crassiusculo 7–9 mm. longo sparse pilosulo vel glabrato;

lamina obovato-oblonga vel oblanceolato-oblonga 7.5–10 cm. longa 2.5–4 cm. lata, subabrupte acuminata, acumine brevi obtuso, basi acuta vel subacuta, supra viridis glabra, costa impressa, nervis venisque obscuris, sublucida, subtus pallidior ubique sparse et persistenter strigosa, costa gracili elevata, nervis lateralibus utroque latere 6–7 teneribus valde irregularibus, venis prominulis laxe irregulariter reticulatis, margine saltem supra medium arcte adpresso-crenato, versus basin integro vel subintegro; inflorescentiae axillares solitariae sessiles brevissime spicatae densae pauciflorae petiolis subaequales; calyx 3 mm. longus ubique dense sericeus, lobis suborbicularibus apice late rotundatis; corolla 7–8 mm. longa fere ad basin partita, lobis late obovato-oblongis apice rotundatis, tantum prope apicem sparse strigillosis; stamina numerosa petalis subaequilonga longiconnata, tubo filamentis liberis subaequilongo; stylus petalis fere aequilongus inferne longipilosus; ovarium dense pilosum.—Zarcero, 1,650 meters, *Austin Smith A380* (type in Herb. Field Mus.). Regarding the tree, the following notes are supplied by the collector: A tree growing in forest; bark thick, dark brown, much roughened, the cambium layer red; leaves dark green and shining on the upper surface; flowers resembling those of coffee, inodorous, the corolla fleshy, white; twigs pale brown.

Symplocos Brenesii Standl., sp. nov.—Arbor 8–10-metralis, ramulis subgracilibus sat dense foliatis primo adpresso-ferrugineo-pilosis; folia inter minora breviter petiolata subcoriacea, petiolo 5–7 mm. longo sparse adpresso-piloso vel glabrato; lamina oblanceolato-oblonga 5.5–7 cm. longa 1.7–2.5 cm. lata acuminata vel longiacuminata, interdum fere caudato-acuminata, basin acutam versus sensim angustata, integra vel perobscure remote crenulata, supra in sicco fusca lucida glabra, costa nervisque impressis, subtus multo pallidior ubique sparse pilis longiusculis brunnescentibus strigosa, costa gracili elevata, nervis lateralibus utroque latere ca. 7 angulo semirecto vel angustiore adscendentibus, venulis prominulis laxe reticulatis; flores numerosi in axillis dense fasciculati vel ut videtur breviter spicati brevissime pedunculati petiolis paullo longiores; calyx 3–3.5 mm. longus ubique dense sericeus, lobis late rotundatis; corolla rosea 8 mm. longa fere ad basin partita, lobis oblongis apice rotundatis dorso dense minute sericeis; stamina numerosa petalis fere aequilonga longiconnata, tubo filamentis liberis duplo longiore; stylus sepalis aequilongus glaber; ovarium dense pilosum 5-loculare. —In forest, La Palma de San Ramón, 1,130 meters, *Brenes 4456* (type in Herb. Field Mus.), *5821*. Collected also on the slopes of

Irazú, at 1,800 meters. Referable to the subsection *Ciponimastrum* of Brand. If I understand the characters, it runs in his key to *S. trachycarpos* Brand, a species of southern Brazil.

Symplocos costaricana Hemsl. Biol. Centr. Amer. Bot. 2: 301. 1881. Without locality, *Endres 148*. Frequent in the region of Santa María de Dota, at about 1,500 meters; also at Fraijanes, on the slopes of Poás; region of San Ramón. Endemic. A tree of 6 meters with smooth, pale bark, or sometimes only a shrub, glabrous throughout or nearly so; leaves petiolate, oblong-elliptic to oblanceolate-oblong, 5–9 cm. long, entire, subacute to acuminate, very lustrous on the upper surface, paler beneath; racemes 5–6-flowered, short; corolla connate to about the middle, white or purplish; ovary glabrous, 4-celled; fruit oblong, 1 cm. long or larger, pale bluish.

Symplocos irazuensis Cufodontis, Archivio Bot. 9: 200. 1933. Southwestern slopes of Volcán de Irazú, above Guayabillos, 2,500 meters, *Cufodontis 361*. A tree of 8 meters, the branchlets puberulent; leaves petiolate, obovate-lanceolate or obovate, as much as 15 cm. long and 7.5 cm. wide, shortly obtuse-acuminate, attenuate to the base, sometimes rounded on one side at the base, entire, glabrous above, densely ferruginous-pubescent beneath; flowers glomerate-racemose, the racemes 5–10-flowered; calyx sericeous; petals obovate-lanceolate, rounded at the apex, 1.5 cm. long, sericeous outside; ovary 4-celled.

Symplocos Limoncillo Humb. & Bonpl. San Cristóbal Road, collected by Stork, at 2,400 meters. Ranging to southern Mexico. A tree of 12 meters, the trunk as much as 20 cm. in diameter, glabrous throughout or nearly so; leaves petiolate, rather thin, oblong or oblong-elliptic, mostly 9–12 cm. long, acuminate, acute at the base, entire or conspicuously serrulate; racemes usually longer than the petioles; corolla pink or white; ovary sparsely pilose; fruit 1.5–2 cm. long, oblong. The Costa Rican material is in fruit only, and there is some doubt as to whether it is properly referable to *S. Limoncillo*. It may be only a variant of *S. costaricana*, but appears different.

Symplocos serrulata Humb. & Bonpl. Region of El Copey, in forest, at about 1,600 meters. Colombia. A tree of 9 meters, the young branches ferruginous-hirsute; leaves coriaceous, short-petiolate or subsessile, elliptic or oblong, 8–15 cm. long, 3–6 cm. wide, acute or acuminate, rounded at the base, serrulate, glabrous above, densely ferruginous-hirsute or pilose beneath; flowers sessile and fasciculate in the leaf axils; corolla pink or white, densely sericeous

outside; style pilose below; fruit oblong, 2 cm. long, glabrous. It is rather unusual for a species of *Symplocos* to range so widely, but I find no characters for separating the Colombian and Costa Rican trees.

OLEACEAE. Olive Family

Chiefly trees or shrubs; leaves commonly opposite, rarely alternate, simple or pinnate, without stipules; flowers regular, 2–4-parted, paniculate, cymose, or fasciculate; calyx inferior, usually small, sometimes none; corolla very variable, sometimes absent; stamens 2–4, the filaments distinct, the anthers 2-celled, the cells longitudinally dehiscent; ovary superior, 2-celled, the ovules few in each cell, the style short or none; fruit a capsule, samara, berry, or drupe. —The typical plant of the family is the olive, *Olea europaea* L. (*olivo*). The genera *Fraxinus* (ash; Spanish, *fresno*) and *Mayepea* also are represented in Central America, and the latter is to be expected in Costa Rica.

FORESTIERA Poir.

Shrubs or trees; leaves opposite, deciduous, simple; flowers very small, fasciculate, bracteate, incomplete and usually imperfect, axillary or on twigs of the previous season; calyx tube short, the limb 4–6-lobate; corolla none; stamens 2 or 4; ovules 2 in each cell; fruit a drupe, usually 1-seeded.—No other species are recorded for Central America.

Forestiera cartaginensis Donn. Smith, Bot. Gaz. 24: 396. 1897. *Puipute.* Cartago, 1,580 meters, *Cooper 5849.* Collected also at San Rafael de Cartago, Cerros de Zurquí, and along Río Reventado north of Cartago (probably the original locality), 1,400–2,500 meters. Endemic. A shrub or tree, sometimes 6 meters high, the young branches pubescent; leaves ovate-elliptic, short-petiolate, 5–7 cm. long, acuminate at each end, entire or serrate toward the apex, pubescent beneath along the costa; flowers short-racemose, short-pedicellate; drupes oblong, somewhat asymmetric, 8–9 mm. long. The plant is abundant on open slopes along the Río Reventado, sometimes forming thickets. At high elevations it grows in moist forest.

JASMINUM L. Jasmine

Shrubs, often scandent; leaves opposite, simple or pinnate; flowers large, solitary or variously clustered; calyx lobate or parted; corolla salverform, the tube cylindric, the limb deeply lobate, the lobes imbricate; stamens 2, included; fruit fleshy, didymous.—

The species of this genus, many of which are noted for their fragrant, showy flowers, are all natives of the Old World. Several of them are cultivated commonly in Central American gardens, where they are usually known by the name Jazmín.

Jasminum grandiflorum L. *Jazmín. Royal jasmine.* Often planted in gardens. Native of southern Asia. A nearly glabrous shrub, the branches usually long and recurved or subscandent; leaves pinnate, with 5–7 leaflets; flowers white.

Jasminum humile L. *Italian yellow jasmine.* Cultivated in gardens for ornament. Native of Asia. Vinelike in habit; leaves pinnate; leaflets usually 5, ovate, acute; flowers bright yellow.

Jasminum pubescens (Retz.) Willd. Planted commonly in gardens. Native of southeastern Asia. An erect shrub with tomentose branches; leaves simple, ovate, acute to rounded at the apex, entire, short-petiolate, densely pubescent beneath; flowers large, white, almost sessile, the corolla lobes acute.

Jasminum Sambac (L.) Soland. *Jazmín.* Sometimes planted for ornament, as in tropical America generally. Said to be native of India. Rather similar to *J. pubescens*, but the leaves glabrate; flowers often or usually double, with obtuse lobes.

LIGUSTRUM L. Privet

Shrubs or small trees; leaves opposite, simple, entire; flowers small, white, perfect, in terminal panicles; calyx small, truncate or 4-dentate; corolla gamopetalous, funnelform, with a short tube, the limb 4-lobate; stamens 2; ovary with 2 ovules in each cell; fruit a 1–3-seeded berry.—All the species of this genus are natives of the Old World.

Ligustrum vulgare L. *Mirto.* Planted for hedges and for ornament about San José, and perhaps elsewhere. Native of Europe and Asia. A densely branched shrub; leaves lanceolate to oblong or elliptic, mostly 1.5–4 cm. long, acute or obtuse, glabrous; flowers small, in dense, small, terminal panicles; fruits black, 4–6 mm. long. This shrub is much planted for hedges in many temperate regions of the earth.

LOGANIACEAE. Nux-vomica Family

Herbs, shrubs, or trees, sometimes scandent; leaves opposite, entire or dentate, without stipules, but the petiole bases often united by a stipular line; flowers perfect, large or small; calyx

inferior, with 4 or 5 lobes; corolla gamopetalous, the limb 4–5-lobate; stamens as many as the corolla lobes and alternate with them, inserted in the throat or tube of the corolla; style simple; fruit capsular, baccate, or drupaceous.—The genus *Plocosperma* is represented in Guatemala, and it is probable that there occurs in Costa Rica *Polypremum procumbens* L., a small annual, common in many parts of Central America.

BUDDLEIA L.

Shrubs or small trees, the pubescence usually of stellate hairs; leaves entire or dentate; flowers small, in dense cymes or heads, these disposed in spikes or cymes; calyx 4-dentate; corolla with 4 small, imbricate lobes; stamens 4; fruit a small capsule.—Other species are known from Central America.

Buddleia alpina Oerst. Vid. Medd. Kjoebenhavn 25. 1853. *Salvia.* Volcán de Irazú, 3,000 meters, *Oersted.* Common on the upper slopes of Irazú and Turrialba; Cerro de Las Vueltas; at 2,700–3,300 meters. Endemic. A shrub or tree, as much as 15 meters high, the crown dense and rounded; leaves petiolate, lanceolate, acuminate, entire, almost glabrous above, densely brown-tomentose or whitish beneath; flowers small, yellow, in terminal panicles. This is the most common tree in the pastures of Turrialba. It has rather handsome foliage, and is conspicuous because of the whitish twigs and lower leaf surfaces.

Buddleia americana L. *Salvia, Hoja de salbe* (Pittier). Common in thickets and hedges, Meseta Central to the coasts, most common on the Pacific slope; Guanacaste. Widely distributed in tropical America. A shrub of 1–2.5 meters; leaves ovate, acuminate, serrate, softly tomentose, petiolate; flowers small, pale yellow, the heads arranged in panicled spikes. The plant is used commonly in Central America in domestic medicine. Pittier states that the crushed leaves are applied as poultices to reduce the inflammation of bruises and wounds.

Buddleia Davidii Franch. *Verbena, Panal, Silencio, Pluma de la reina.* A slender shrub of Chinese origin, with handsome, blue flowers. Cultivated commonly in gardens, at least in the temperate and cooler regions.

I do not know what the plant may be that is reported for Costa Rica under the name *B. elliptica* Mart. & Gal. (Surubres, *Biolley*), but it is surely not the Mexican species to which the name properly belongs.

Buddleia floccosa Kunth. *Salvia.* Regions of Cartago and Dota. Also in Guatemala and Mexico. A shrub of 1–1.5 meters, covered throughout with a dense, brown wool; leaves oblong or lanceolate, acute or obtuse, serrulate, small; flowers greenish, the heads very dense, arranged in simple or paniculate spikes. It is said that the leaves are employed as a tonic.

CYNOCTONUM Gmel.

Annual herbs, the leaves opposite, entire, the stipules minute, or the leaf bases connected by a stipular line; flowers small, whitish, in one-sided, cymose spikes; calyx 5-parted; corolla urceolate, 5–10-lobate; stamens 5, included, the filaments short, the anthers cordate; style short, divided below, united above by the common stigma; capsule bilobate at the apex, the carpels divaricate, dehiscent along the inner margin; seeds numerous, small, tuberculate.—A single species is found in Central America.

Cynoctonum Mitreola (L.) Britton. *Cynoctonum petiolatum* Gmel. Reported from La Boruca and Nicoya. Widely distributed in tropical America. A small, glabrous annual; leaves petiolate, ovate, entire; flowers minute, 2 mm. long, white, in spikes that form axillary and terminal cymes; capsule 3 mm. long, bilobate at the apex and resembling a miter.

POTALIA Aubl.

A low shrub, usually unbranched, with a thick stem; calyx 4-parted, the lobes rounded, imbricate in bud; corolla tubular-campanulate, the limb 10-lobate; stamens 10, the very short filaments adnate to the corolla tube; ovary 2-celled, the ovules numerous in each cell; fruit baccate, indehiscent, turbinate.—The genus consists of a single species.

Potalia amara Aubl. Collected at San Miguel by Wendland; I have seen also a recent specimen, without locality. Guianas to Brazil and Peru. A shrub of 1–2 meters, glabrous throughout; leaves elongate-oblanceolate, 30 cm. long or much longer, acute, long-attenuate to the base, short-petiolate or almost sessile, the costa stout and very conspicuous beneath, the other venation obsolete; flowers yellow-green, in terminal and axillary, trichotomous cymes, the pedicels short and thick, squamose-bracteate; calyx 8 mm. long; corolla about 12 mm. long. The plant is unknown elsewhere in North America, and its occurrence in Costa Rica, far from its nearest known occurrence in the Guianas, was scarcely to be expected.

SPIGELIA L.

Low, perennial herbs, almost glabrous, the stems simple or branched; leaves entire, acute or acuminate, often sessile; corolla tubular, small or large; capsule didymous, circumscissile.

Spigelia anthelmia L. Common in moist places of the tierra caliente. Widely distributed in tropical America. A low plant, the leaves lanceolate, the upper ones sessile and verticillate; flowers 1 cm. long, white or pinkish; capsule covered with small, spinelike protuberances. In Panama the plant is known as Lombricera. This species, like the following one, has a high reputation throughout Central America as a remedy for intestinal parasites, especially tapeworms.

Spigelia Humboldtiana Cham. & Schlecht. *Lombricera.* Common in moist places, Meseta Central to the coasts; region of San Ramón; Guanacaste. Widely dispersed in tropical America. Similar to the preceding species, but the flowers smaller, and the capsule smooth.

Spigelia splendens Wendl. *Colmillo de puerco, Cresta de gallo.* Moist places of the Meseta Central, especially about Cartago, but apparently rather rare. Also in Guatemala and southern Mexico. An herb about 60 cm. high; leaves ovate or broader, somewhat pubescent, verticillate; corolla red or flesh-colored, 2 cm. long. A beautiful plant because of its large, bright-colored flowers.

STRYCHNOS L.

Scandent shrubs, often provided with spines or tendrils; leaves opposite, entire, ovate or lanceolate, 3–5-nerved, acute; flowers white or yellowish, about 2 cm. long, in terminal or axillary cymes; corolla with a long, slender tube and 5 short lobes; fruit globose, indehiscent, usually 4 cm. or more in diameter, with few or numerous large, compressed seeds.—An Indian species yields the drugs nux-vomica and strychnine, and it is probable that the seeds of the Central American species possess poisonous principles. Other species are known from Central America.

Strychnos chlorantha Prog. in Mart. Fl. Bras. 6, pt. 1: 273. 1868. Without locality, *Hoffmann 790* (photo. seen of the type, in herb. Berlin). Known only from the original collection. Glabrous; leaves coriaceous, short-petiolate, obovate, 5–7.5 cm. long, 3.5–5 cm. wide, subobtuse or short-acuminate, acute at the base, 3–5-nerved, lustrous; cymes pedunculate, terminal, equaling the leaves,

many-flowered; calyx lobes broadly ovate, obtuse, ciliate; corolla glabrous, green, the tube 12–14 mm. long, the lobes 4 mm. long.

Strychnos darienensis Seemann. Forests of the Atlantic tierra caliente, also in Guanacaste. Panama. A woody vine, armed with spines, the young branches appressed-pilose; leaves coriaceous, acute at the base, glabrous or nearly so; flowers glabrous.

Strychnos panamensis Seemann. Common in forests and thickets of the tierra caliente. Panama to Guatemala and probably to southern Mexico. A large, slender vine, armed with stiff spines, almost glabrous; leaves acute or acuminate, usually triplinerved, rather thin; flowers white, glabrous; fruit globose, 4–8 cm. in diameter, yellowish. This species is known in Panama by the names Canjura and Fruta de murciélago.

Strychnos toxifera Benth. Forests of the tierra caliente. Ranging to Brazil. A small or large vine, covered on all parts with long, soft, spreading hairs. A widely known plant which received in Brazil the name Urari, supplying at least one of the elements of the drug curare, one of the most poisonous substances known. Introduced into the blood stream in minute quantities, it paralyzes almost instantly the motor nerves, and produces rapid death. The drug is obtained from the bark of the roots. Curare has been much used by the South American Indians for poisoning their arrows, and it is stated that it is so used even today by the Indians in some parts of Panama.

GENTIANACEAE. Gentian Family

Herbs, rarely shrubs, usually glabrous; leaves opposite, entire, without stipules, sometimes reduced to scales; flowers regular, perfect, terminal or axillary, small or large and showy; calyx inferior, persistent, the segments more or less united; corolla gamopetalous, the stamens alternate with the lobes, inserted in the throat or tube; ovary 1-celled or imperfectly 2-celled; style simple or none, the stigma entire or bilobate; fruit capsular, usually dehiscent by 2 valves.—Other genera are represented in Central America.

CENTAURIUM Gilib.

Annual herbs, simple or branched, the leaves sessile; flowers small, usually pink, in cymes; calyx 4–5-lobate, the segments narrow; corolla tube short or elongate; stamens 4 or 5, the anthers spirally twisted; stigma bilobate.—A few other species are represented in Central America.

Centaurium quitense (HBK.) Robinson. *Erythraea quitensis* HBK. Moist or grassy places of the central region, at 800–1,300 meters; region of San Ramón. Guatemala to Peru. A slender herb about 30 cm. high, branched, the branches often spreading; sepals narrowly attenuate; corolla pink, 8 mm. long.

Centaurium strictum (Schlecht.) Druce. *Erythraea stricta* var. *tereticaulis* Donn. Smith, Bot. Gaz. 24: 398. 1897 (Surubres, *Biolley 7076*). Frequent in meadows and oak forests of Dota, 1,500–1,800 meters. Ranging to Mexico. Plants simple or with few erect branches; leaves linear or narrowly oblong; sepals acute or almost obtuse.

CHELONANTHUS (Griseb.) Gilg

Annual or perennial herbs, simple or sparsely branched; flowers in terminal cymes, often secund upon the branches; calyx 5-parted, the segments not carinate; corolla tube dilated above, gradually expanded into the lobes; stamens 5, inserted in the lower part of the tube, the filaments usually unequal; anthers spirally coiled; ovary almost 2-celled, the style filiform, the stigma 2-lamellate; capsule globose or ovoid, much longer than the calyx.—A single species is found in Central America.

Chelonanthus alatus (Aubl.) Pulle. *Lisianthus alatus* Aubl. Plains of the Pacific coast; Boruca; Buenos Aires; region of San Ramón, at 1,025 meters or less. British Honduras to Brazil. An herb of 1–2 meters, simple or sparsely branched; leaves large, ovate or lanceolate; flowers green, about 2 cm. long, disposed in large cymes composed of one-sided racemes; stigma persistent; calyx lobes rounded at the apex.

COUTOUBEA Aubl.

Annual or perennial herbs, simple or sparsely branched; leaves chiefly opposite, sessile or clasping; flowers small, white or purplish, sessile or nearly so, usually in terminal, dense spikes; calyx 5-parted, the lobes carinate, acute; corolla tube short, cylindric, the limb 4-lobate, the lobes narrow, spreading; stamens 4, inserted in the upper part of the tube, the filaments filiform, winged below, the anthers erect, deeply cordate at the base; ovary 1-celled, the style filiform, the stigma 2-lamellate; capsule septicidal.—In Central America the genus is represented by a single species.

Coutoubea spicata Aubl. Plains of the Pacific coast; Boruca; Buenos Aires; at 500 meters or less. British Honduras to Brazil.

A sparsely branched herb, a meter or less in height; leaves sessile, oblong or lance-linear; flowers 1 cm. long, white, in long, very dense spikes.

CURTIA Cham. & Schlecht.

Slender, erect, annual herbs; leaves opposite or verticillate, small, sessile; flowers small, densely corymbose-cymose or laxly paniculate; calyx usually 5-parted, the segments narrow, acute, carinate; corolla subfunnelform, the cylindric tube slightly ampliate above, the lobes short, ovate or lanceolate, contorted; stamens commonly 5, usually coherent, the filaments filiform, the anthers usually included, ovate or oblong; ovary almost 2-celled, the style short or elongate and filiform, the stigma capitate; capsule 2-valvate, the small seeds foveolate.—In Central America a single species is known.

Curtia tenella (Mart.) Cham. Found at San Pedro and Buenos Aires, 480 meters; also at various places in the region of San Ramón, 1,200 meters or less. Honduras to Brazil. Plants slender, annual, 20 cm. high or less, simple or sparsely branched; leaves linear; flowers white, 5–7 mm. long, in few- or many-flowered cymes. The plant grows usually in savannas or other grassy places.

ENICOSTEMA Blume

Perennial herbs; leaves sessile, lanceolate or linear-lanceolate; flowers small, glomerate in the leaf axils; calyx narrowly campanulate, deeply 5-cleft; corolla almost funnelform, the tube somewhat enlarged above the middle, the 5 lobes contorted, spreading; stamens included, the filaments filiform, the anthers oblong, erect, the connective apiculate; ovary 1-celled, the style short, the stigma globose; capsule oblong, bivalvate.—A single species is known.

Enicostema verticillatum (L.) Gilg. Limón, *Quirós 470*. Extending to West Indies, and in the Old World tropics. Plants glabrous, branched, a meter high or less; leaves acuminate, 3-nerved, 4–10 cm. long; calyx 5 mm. long; corolla white, 6 mm. long; capsule about equaling the calyx.

GENTIANA L. Gentian

Herbs, various in habit, the leaves opposite, commonly sessile; flowers small or large, axillary or terminal, generally sessile; calyx tubular, 4–7-lobate, often winged or carinate; corolla salverform, funnelform, or tubular-campanulate, the throat often appendaged, the lobes contorted; stamens as many as the corolla lobes, included,

the anthers ovate to linear; ovary 1-celled; capsule bivalvate, the seeds numerous, often winged.—The genus is a very large one, well represented in temperate North America and in the Andes, but probably no other species is native in Central America.

Gentiana sedifolia HBK. Rare in paramos of Cerro de Las Vueltas, 3,000 meters. Ranging to Colombia and Ecuador. A very small plant, only 1–2 cm. high, forming small, dense mats or clumps; leaves oblong, acute, only 5 mm. long; flowers terminal, solitary, white or blue, 7 mm. long. The plant is so small that it is difficult to distinguish among the mosses and other small plants with which it grows.

HALENIA Borck.

Perennial herbs; flowers yellowish or greenish, in terminal or axillary cymes, or often paniculate; calyx 4-parted; corolla campanulate, each lobe with a spur near its base; capsule 1-celled, bivalvate.—Other Central American species grow in Guatemala.

Halenia Aquilegiella Standl., sp. nov.—Perennis, glabra, 9–20 cm. alta, caulibus paucis erectis vel adscendentibus gracilibus simplicibus; folia basalia rosulam densam efformantia linearioblanceolata, lamina 2–2.5 cm. longa, 3–5 mm. lata acutiuscula basin versus longe sensim in petiolum elongatum attenuata; folia caulina ca. 3 paria distantia sessilia linearia vel lineari-oblonga usque ad 2 cm. longa; inflorescentia terminalis cymoso-paniculata racemiformis pauciflora, pedicellis brevibus vel usque ad 1 cm. longis; sepala 5 mm. longa anguste oblonga acutiuscula, apicibus breviter recurvis; corolla luteo-viridis calcaribus exclusis 7–8 mm. longa, lobis apice late rotundatis, calcaribus corolla duplo brevioribus paullo incurvis.—Paramo of Cerro de Las Vueltas, Prov. San José, 3,000 meters, *Standley & Valerio 43631* (type in U. S. Nat. Herb.); also *No. 43681* from the same locality. The species is quite distinct from others known from Central America, but related to certain species of the Andes of South America.

Halenia rhyacophila Allen, Ann. Mo. Bot. Gard. 20: 168. *pl. 8, f. 6.* 1933. *H. rhyacophila* var. *procumbens* Allen, op. cit. 170 (Volcán de Turrialba, *Standley 35285*); *H. rhyacophila* var. *macropoda* Allen, loc. cit. (Volcán de Poás, *Greenman & Greenman 5994*). Potrero del Alto, Volcán de Poás, 2,460 meters, *Pittier 2975*. Forests, thickets, and paramos of the upper slopes of the central region, 2,200–3,000 meters. Endemic. An erect or ascending herb of 30–60 cm., simple or branched; basal leaves oblanceolate, 7 cm.

long or more; flowers green, arranged in a few- or many-flowered panicle; corolla 8–15 mm. long, the spurs short, divaricate. This plant has been reported from Costa Rica under the name *H. multiflora* Benth., a Mexican species. The two varieties mentioned have no taxonomic importance.

LEIPHAIMOS Schlecht. & Cham.

Small, simple or sparsely branched, saprophytic herbs, without chlorophyll, the leaves represented by scales; flowers solitary and terminal or in cymes; calyx tubular or campanulate, 4–5-dentate or deeply lobate; corolla salverform, the tube usually attenuate above, the 4–5 lobes contorted, obtuse or acuminate; stamens included, the filaments filiform or very short, the anthers connate or free; ovary 1-celled, the style filiform, the stigma capitate; capsule oblong or linear, 2-valvate.—Several species are found in Central America, most of them in Panama. Some of the plants are rather showy, their flowers varying from white to yellow or blue. They are easily recognized by the absence of chlorophyll, gamopetalous corolla, and slender habit. They grow usually among decaying leaves in the deepest forests.

Leiphaimos simplex (Griseb.) Standl. *Voyria simplex* Griseb. Reported from Cerros de Ochoa, Valley of San Carlos, *Pittier 9661, 9662*. Panama to British Honduras. Plants small, saprophytic, the stem slender, simple, 6–12 cm. long, white, the leaves represented by a few pairs of scales; flower solitary, terminal, blue; corolla tube 8 mm. long, the 5 lobes spreading, 3–4 mm. long. There has been reported from the same region *L. flavescens* (Griseb.) Gilg (*Voyria flavescens* Griseb.), a plant with yellowish corollas. It is probable that the collection so named belongs to one of the species described from Panama by the present author.

LISIANTHUS L.

Reference: Perkins, Bot. Jahrb. 31: 489. 1902.

Annual or perennial herbs, usually branched; leaves lanceolate or broader; flowers small or large, cymose or corymbose; stigma capitate; capsule imperfectly 2-celled.—Several other species are known from Central America.

Lisianthus arcuatus Perkins, Bot. Jahrb. 31: 492. 1902. Type collected in Costa Rica or Panama by Warscewicz. Also at Desengaño, *Hoffmann 832*. Region of San Ramón; Guanacaste. Endemic. Leaves oblong-lanceolate, 7–12 cm. long, acuminate;

flowers few, the branches of the cyme elongate; calyx 5 mm. long; corolla tube 4.5 cm. long, the lobes only 5 mm. long.

Lisianthus corymbosus Perkins, Bot. Jahrb. 31: 491. 1902. Type collected by Warscewicz, without indication of the exact locality. Found also at Pacaca, Santa Bárbara, Villa Colón, Tacares, Catalina, and Río Poás; region of San Ramón. Endemic. Leaves ovate or oblong-ovate, 4–7 cm. long; inflorescence many-flowered, dense, cymose; calyx 15 mm. long; corolla tube 2.5 cm. long, the lobes 1 cm. long.

Lisianthus nigrescens Cham. & Schlecht. Pacaca, *Oersted*. Guatemala and Mexico. Plants tall and branched, the leaves oblong-lanceolate, acuminate; flowers cymose, blackish, forming a large panicle; corolla about 4 cm. long, very narrow. Easy to recognize because of the dark color of the corolla.

Lisianthus Seemannii (Griseb.) Perkins. *Leianthus Seemannii* Griseb. Collected by Endres, without indication of the exact locality. Panama. Inflorescence cymose, many-flowered, dense; corolla lobes oblong-lanceolate, cuspidate-acuminate; sepals not carinate.

MACROCARPAEA Gilg

Tall herbs or shrubs, the leaves often very large; flowers large and showy, in terminal, few- or many-flowered inflorescences; calyx short, the 5 lobes obtuse; corolla tube short, cylindric, campanulate-ampliate above, the 5 lobes short, rounded; stamens inserted in the dilated portion of the tube; ovary 1-celled, the style filiform, the stigma bilamellate; capsule somewhat compressed.—No other Central American species is known.

Macrocarpaea Valerii Standl., sp. nov.—Herba alta glabra ut videtur sparse ramosa, caulibus obtuse tetragonis, internodiis valde elongatis; folia caulina breviter petiolata rotundata ca. 7 cm. longa et aequilata apice late rotundata vel truncata et breviter cuspidato-apiculata, basi rotundata; inflorescentia cymoso-paniculata multiflora 30 cm. longa et aequilata, floribus interdum recurvis, pedicellis crassis ad 1.5 cm. longis; calyx campanulatus 1 cm. longus basi obtusus vel rotundatus, lobis latis apice subtruncatis vel late rotundatis vix 3 mm. longis; corolla 2.5 cm. longa vel ultra glabra, lobis latis 6 mm. longis.—La Hondura de San José, 1,300 meters, *Manuel Valerio 692* (type in Herb. Field Mus.). It is probable that a collection I have not seen, Rancho Redondo, *Pittier 1153*,

reported under the name *Lisianthus thamnoides* Griseb., a Jamaican species, represents this same species.

SCHULTESIA Mart.

Annual herbs, the leaves narrow or broad; flowers small or large, cymose, few or numerous; style deciduous; anthers not twisted.—Other species are found in Central America.

Schultesia guianensis (Aubl.) Malme. *Canchalagua. S. stenophylla* Mart. Hills of Nicoya. Mexico to Brazil. Plants 30 cm. high or less; leaves lanceolate or oblong; corolla pink, 2 cm. long; sepals not winged. Pittier reports that the plant is employed in domestic medicine as a depurative, in the treatment of diseases of women.

Schultesia lisianthoides (Griseb.) Benth. & Hook. Thickets near Capulín, region of San Ramón, at 1,000 meters or less, and probably elsewhere in the Pacific tierra caliente. Guatemala to Venezuela. A branched herb 30 cm. high or more; leaves large, obovate or oblong; flowers 12 mm. long, numerous, pink; sepals not winged.

SYMBOLANTHUS Don

Tall herbs or shrubs, the leaves broad, petiolate, acute or acuminate; flowers few, terminal or axillary, very large, solitary or fasciculate; style persistent, the stigma bilobate; capsule incompletely 2-celled.—No other species are known from Central America.

Symbolanthus pulcherrimus Gilg, Bot. Jahrb. 22: 344. 1896. *Flor de la reina. Lisianthus pulcherrimus* Donn. Smith in Pitt. Prim. 2: 166. 1898. Cartago, *Hoffmann 673*. Regions of Cartago, El Copey, and San Ramón, at 1,100–2,500 meters. Also in Panama. A tall herb or shrub; leaves oblong-lanceolate, 6–11 cm. long; sepals green, 2–2.5 cm. long; corolla red or rose-colored, 9 cm. long, the tube broad.

Symbolanthus rubroviolaceus Gilg, Bot. Jahrb. 22: 345. 1896. Near La Paz, between Desengaño and Cariblanco, *Wendland 974*. Collected also at La Hondura, Yerba Buena, and La Palma de San Ramón, 1,100–2,000 meters. Endemic. A shrub of 1–1.5 meters; leaves oval-oblong, 10–20 cm. long; calyx almost 3 cm. long; corolla 10 cm. long or more. I have never seen these plants in flower, but judge that they must be unusually conspicuous and showy.

MENYANTHACEAE. Bog-bean Family

The group is represented in Central America by a single genus. By many authors the family is united with the Gentianaceae.

LIMNANTHEMUM Gmel.

A single species occurs in Central America.

Limnanthemum Humboldtianum (HBK.) Griseb. *Nymphoides Humboldtianum* Kuntze. Collections have been seen from Buenos Aires and the region of Cartago, and it is probable that the species is frequent in the tierra caliente. Widely distributed in tropical America. A perennial, aquatic plant, growing in ponds or lakes; leaves rounded-cordate or reniform, floating, entire, glabrous, 4–16 cm. wide, the petioles very long; flowers small, white, in umbels that arise from the petioles; corolla 5-lobate, 1.5 cm. long, the margins of the lobes laciniate; fruit a small capsule. Easy to recognize because of the insertion of the flowers upon the petiole.

APOCYNACEAE. Dogbane Family

References: Robert E. Woodson, Jr., The American genera of Echitoideae, Ann Mo. Bot. Gard. 20: 1–186. 1933; 22: 153–306. 1935; 23: 169–426. 1936.

Herbs, shrubs, or trees, often scandent, usually with milky latex; leaves simple, without stipules, entire; flowers perfect, regular, 5-parted, variously disposed; calyx inferior, persistent, the lobes imbricate in bud; corolla gamopetalous, the lobes convolute, often twisted; stamens 5, alternate with the corolla lobes, inserted in the tube or throat, the anthers 2-celled; ovary superior, of 2 distinct carpels, or 1-celled and with 2 parietal placentae, or 2-celled; style simple or divided, the stigma simple; fruit usually of 2 follicles or drupes, sometimes of a single drupe, or a capsule; seeds often winged or otherwise appendaged.—A few other genera are represented in Central America.

ALLAMANDA L.

Shrubs, trees, or woody vines; leaves opposite or verticillate; flowers large, in small, terminal cymes; calyx 5-parted, the segments lanceolate or broader, foliaceous; corolla funnelform; anthers free from the stigma, their sacs not appendaged; ovary 1-celled; fruit a compressed, ovate, spiny capsule.—No other species are known from Central America.

Allamanda cathartica L. *Bejuco de San José, Jalapa.* Occasional in swampy forests of the Atlantic coast; cultivated for orna-

ment in the tierra templada and elsewhere, as at San José. Central America to West Indies and South America. A large, woody vine; leaves ternate or quaternate, short-petiolate or sessile, mostly oblong or oblanceolate, 6–15 cm. long, short-acuminate, attenuate to the base, somewhat coriaceous, glabrous and lustrous above, more or less pilose beneath; calyx lobes 10–15 mm. long; corolla bright yellow, 7–9 cm. long; capsule suborbicular, 4–6 cm. in diameter, densely covered with rather soft spines. A handsome and showy vine, often planted for ornament in tropical regions.

ALLOMARKGRAFIA Woodson

Large, woody vines; leaves opposite, on the lower surface bearing several inconspicuous, glandular emergences indefinitely clustered at the base of the costa; inflorescence lateral, racemose; calyx 5-parted, the lobes subequal, bearing within many glandular squamellae; corolla funnelform, the tube straight, narrowly cylindric below, abruptly dilated into the broad, campanulate throat at the insertion of the stamens, the limb 5-parted; stamens included, inserted at the base of the corolla throat, the anthers connivent and agglutinated to the stigma, the connective sagittate, obtusely 2-auriculate, peltate; carpels 2, united at the apex; nectaries 5, distinct or somewhat concrescent at the base; follicles 2, terete, dehiscent along the ventral suture; seeds numerous, truncate, apically comose.—No other species are known from Central America.

Allomarkgrafia Brenesiana Woodson, Ann. Mo. Bot. Gard. 24: 15. 1937. Forest between La Balsa and Cataratas de San Ramón, 850 meters, *Brenes 4509*. Endemic, and known only from the region of San Ramón. A large, woody vine, glabrous throughout; leaves short-petiolate, oblong, 8–12 cm. long, 2–3.5 cm. wide, short-acuminate, obtuse or rounded at the base, subcoriaceous; flowers fragrant, whitish; calyx segments ovate or ovate-lanceolate, acute, 2–2.5 cm. long; corolla tube 13–15 mm. long, the throat 2 cm. long, the lobes 2–2.5 cm. long.

Allomarkgrafia plumeriaeflora Woodson. Reported from the region of El General, collected by Skutch. Colombia. A large vine, glabrous; leaves short-petiolate, oblong-elliptic, 14–16 cm. long, 5–5.5 cm. wide, short-acuminate, obtuse or rounded at the base, coriaceous, obscurely multiglandular above along the costa; calyx segments broadly ovate, obtuse, 3–4 mm. long, 2-glandular within at the base; corolla tube 10–12 mm. long, the throat 7 mm. long, the lobes 15 mm. long.

Allomarkgrafia subtubulosa Woodson, Ann. Mo. Bot. Gard. 24: 16. 1937. In forest, hills near San Ramón, 975–1,000 meters, *Brenes 5457*. A woody vine 10–15 meters long, glabrous throughout; leaves short-petiolate, coriaceous, oblong-oval, 8–12 cm. long, 3–5 cm. wide, obtuse or shortly obtuse-acuminate, obtuse at the base, multiglandular above at the base of the costa; inflorescences apparently simple (branched in other species), the flowers creamy yellow; calyx segments ovate, broadly acute or rounded, 2–2.5 mm. long; corolla subtubular, the tube 2–2.5 cm. long, the lobes obliquely obovate, 1.7–2 cm. long.

ANECHITES Griseb.

Slender vines, the leaves opposite, petiolate, thin; flowers small, white, in lax, long-pedunculate, racemiform inflorescences opposite the leaves; calyx small, 5-cleft, glanduliferous within at the base; corolla salverform, the tube contracted at the throat, the 5 lobes sinistrorsely convolute; anthers oblong, the sacs not appendaged; carpels 2, distinct; follicles linear, terete, stipitate.—The genus consists of a single species.

Anechites Nerium (Aubl.) Urban. Changuinola Valley. Extending to West Indies and Ecuador. Stems sparsely pubescent with short, stiff hairs; leaves oblong-ovate, 5–10 cm. long, acute or acuminate, rounded or subcordate at the base, with scattered, short hairs above, sparsely pubescent beneath on the costa; peduncles 10–15 cm. long, the pedicels subfiliform, 8–15 mm. long; calyx 2–3 mm. long; corolla tube 6 mm. long, the limb 12–15 mm. wide; follicles 6–8 cm. long, sparsely pubescent below, hispid above.

BEAUMONTIA Wall.

Beaumontia grandiflora Wall. *Flor de Santa Ana.* Planted occasionally for ornament. Native of the East Indies. A large, woody vine; leaves opposite, short-petiolate, oblong-obovate, rounded and short-acuminate at the apex, attenuate to the base, glabrous or nearly so; flowers very large and showy, white, in terminal cymes, the calyx segments large and foliaceous; corolla funnelform, as much as 20 cm. long. The vine is an exceedingly showy and handsome one, the pure white flowers strikingly similar to those of *Datura*.

CATHARANTHUS G. Don

Herbs, the leaves opposite; flowers rather large, axillary, solitary or geminate; calyx 5-cleft, eglandular, with narrow lobes; corolla salverform, the tube cylindric, slightly dilated above, the 5 lobes

broad; stamens included, the anthers not appendaged; disk of 2 large glands; carpels 2, distinct; follicles narrow-cylindric, the seeds small, not appendaged.—No other species are known from Central America.

Catharanthus roseus (L.) G. Don. *Vinca rosea* L.; *Lochnera rosea* Reichenb. I have seen no Costa Rican specimens, but the plant is undoubtedly in cultivation here, and doubtless naturalized, at least in the Atlantic coast. The plants usually are found in the cemeteries of the Central American tierra caliente, where they were planted originally for ornament. Native probably of the Old World tropics, but widely naturalized in America. An erect herb less than a meter high, more or less pubescent; leaves short-petiolate, oblong or oblong-oblanceolate, obtuse or retuse at the apex; calyx lobes linear-subulate; corolla white or pink, the tube 2.5–3 cm. long, the broad lobes somewhat shorter; follicles 2–3 cm. long.

CUFODONTIA Woodson

Shrubs; leaves alternate, entire, penninerved, eglandular; inflorescence irregularly paniculate, lateral or subterminal; calyx 4-parted, eglandular, the lobes imbricate, unequal, the outer 2 more or less connate, the inner 2 much smaller and included; corolla salverform, the tube cylindric, the throat with 5 minute, pilose scales, the limb 5-lobate; stamens included, the anthers free, 4-celled, not appendaged, the filaments very short; carpels 2, distinct at the base, the ovules numerous, the stigma fusiform-capitate; fruit probably follicular.—The genus was named for Dr. Giorgi Cufodontis, who made a large collection of plants in Costa Rica in 1930, as botanist of an Austrian expedition to the country. Two other species are known, in Mexico and Guatemala. The genus is well marked by the very unequal, biseriate calyx lobes.

Cufodontia stegomeris Woodson, Archivio Bot. 10: 39. *pl. 2.* 1934. Osa Peninsula, Golfo Dulce, near Puerto Jiménez, Finca Santa María, 20 meters, *Cufodontis 220.* Leaves petiolate, obovate-lanceolate or elliptic, 5–8 cm. long, 2–3.5 cm. wide, acuminate, acute at the base, membranaceous, glaucescent beneath, glabrous; panicles shorter than the leaves, many-flowered, minutely pale-puberulent; calyx segments minutely puberulent-papillose, the outer ones 3–3.5 mm. long; corolla whitish, the tube 5–6 mm. long, the lobes obliquely oblong, 5 mm. long.

ECHITES P. Br.

More or less frutescent vines; leaves petiolate, penninerved, eglandular; inflorescence usually lateral, bracteate, with few or

numerous flowers; calyx 5-parted, the segments equal or nearly so, bearing within at the base a solitary, often deeply dissected scale; corolla salverform, the tube straight, the limb 5-parted, dextrorsely convolute; anthers included, agglutinated to the stigma, the connective sagittate, narrowly 2-auriculate; carpels 2, united at the apex; nectaries 5, distinct or concrescent; follicles 2, terete, continuous, dehiscent along the ventral suture; seeds numerous, comose. —Two other species are known from Central America.

Echites turbinata Woodson, Ann. Mo. Bot. Gard. 21: 615. 1934; 22: 14. *pl. 2, f. 2.* 1935. Forests of Rancho Flores, *Tonduz 2147*. Known only from the original collection. Leaves elliptic, 7.5–12 cm. long, 3.5–7 cm. wide, acuminate, broadly obtuse at the base, glabrous; calyx segments ovate, acuminate, 3 mm. long, glabrous; corolla minutely puberulent-papillose, the tube 7–8 mm. long, the lobes elliptic-lanceolate, acuminate, 14–16 mm. long; ovary puberulent-papillate.

Echites tuxtlensis Standl. Collected on Volcán de Barba by Oersted. Mexico and British Honduras. Leaves short-petiolate, lance-elliptic or obovate-elliptic, 6–10 cm. long, 1.5–3.5 cm. wide, acuminate, cuneate at the base, glabrous; calyx segments ovate-trigonous, acute or acuminate, 1–1.5 mm. long, glabrous; corolla glabrous, the tube 8–10 mm. long, the lobes oblong-lanceolate or elliptic-lanceolate, acuminate, somewhat shorter than the tube; ovary glabrous.

FERNALDIA Woodson

More or less frutescent vines; leaves petiolate, entire, eglandular, the petioles subtended by several minute, pectinate stipular appendages; inflorescence lateral, simply scorpioid, with several large, white flowers; calyx segments equal or nearly so, scarious or only slightly foliaceous, bearing solitary, opposite scales within at the base; corolla funnelform, slightly gibbous or essentially straight, the limb 5-parted, dextrorsely convolute, more or less arachnoid-villous within; stamens included, the anthers connivent and agglutinated to the stigma, the connective obtusely 2-auriculate, peltate; carpels 2, united at the apex; nectaries concrescent, unequally 4-lobate; follicles 2, terete, dehiscent along the ventral suture; seeds numerous, truncate, comose.—The only other species is found in Guatemala.

Fernaldia pandurata (A. DC.) Woodson. Collected in Costa Rica by Hoffmann, the locality not indicated. Extending to Mexico.

Leaves oblong-elliptic to broadly ovate, 4–13 cm. long, 1.5–8 cm. wide, short-acuminate, cordate to obtuse at the base, membranaceous, densely puberulent or velutinous-pilose; calyx segments ovate, acute to obtuse, 2–3 mm. long; corolla glabrous outside or nearly so, the tube 2 cm. long, the throat 9–12 mm. long, the lobes 10–13 mm. long, acute or acuminate.

FORSTERONIA G. F. W. Meyer

Woody vines; leaves opposite, the upper surfaces with few or several glandular emergences at the base of the costa, or eglandular, usually foveate beneath in the axils of the nerves; inflorescence terminal or terminal and lateral, cymose-paniculate or thyrsiform; calyx 5-parted, the lobes equal or nearly so, with one or several scales, or the scales absent; corolla rotate or subrotate, the tube short; anthers exserted or included, connivent and agglutinate to the stigma, the connective peltate, sagittate; carpels 2, united at the apex; nectaries 5, distinct or more or less concrescent; follicles 2, dehiscent along the ventral suture; seeds numerous, truncate, comose.—Two other species are known from Central America.

Forsteronia myriantha Donn. Smith. Occasional in forests and thickets of the tierra caliente, ascending to the Meseta Central, at 1,200 meters or less; Guanacaste; region of San Ramón. Guatemala. Stems puberulent when young; leaves short-petiolate, elliptic to oval, 5–10 cm. long, 2–4.5 cm. wide, acute or acuminate, rarely obtuse, obtuse to broadly acute at the base, glabrous or nearly so; inflorescence densely and broadly thyrsiform, the very numerous flowers white; calyx 1 mm. long; corolla glabrous or minutely papillate, the tube scarcely 1 mm. long, the lobes 2.5–3 mm. long.

Forsteronia spicata (Jacq.) G. F. W. Meyer. Thickets of Guanacaste, at low elevations, collected only by Brenes. Mexico to Cuba and Colombia. Young branches minutely ferruginous-tomentulose when young; leaves short-petiolate, broadly oval to obovate-elliptic, 6–16 cm. long, 3.5–9 cm. wide, subcaudate-acuminate, rarely obtuse, broadly obtuse or rounded at the base, minutely and sparsely pilosulous above, tomentulose or glabrate beneath; inflorescence thyrsiform or usually dense and spikelike; calyx 2.5–4 mm. long; corolla tube 1.5–2 mm. long, the lobes 3.5–4 mm. long, puberulent-papillate outside, pilosulous within; follicles 12–19 cm. long.

MALOUETIA A. DC.

Shrubs or small trees; leaves opposite, eglandular above, often foveate beneath in the axils of the nerves; inflorescence terminal,

with few or rather numerous flowers; calyx 5-parted, the segments subequal, bearing within solitary or rarely geminate, glandular scales; corolla salverform, the limb 5-parted, dextrorsely convolute; anthers almost completely exserted to wholly included, connivent and agglutinated to the stigma, the connective sagittate, peltate; carpels 2, united at the apex; follicles 2, narrowly terete to broadly fusiform, dehiscent along the ventral suture; seeds numerous, ecomose.—No other species are known from Central America.

Malouetia guatemalensis (Muell. Arg.) Standl. Occasional in forests of the Atlantic coast. Panama to Guatemala. A shrub or small tree, sometimes 10 meters high; leaves short-petiolate, oblong to ovate-elliptic, 6–25 cm. long, subcaudate-acuminate, obtuse or acute at the base, glabrous; flowers greenish white; calyx lobes 1.5–2.5 mm. long, ovate, acute or obtuse; corolla tube 4–5.5 mm. long, the lobes obliquely lanceolate to ovate-oblong, acuminate, 7–12 mm. long, puberulent-papillate within; anthers included; follicles fusiform, 10–13 cm. long, 1–2 cm. in diameter.

MANDEVILLA Lindl.

Woody or suffrutescent vines; leaves mostly opposite, the lower surface bearing several inconspicuous, glandular emergences at the base of the costa or scattered along it, rarely eglandular; inflorescence commonly lateral; calyx 5-parted, the lobes equal or nearly so, bearing within 5 or more scales; corolla funnelform, salverform, or tubular-salverform, the tube straight or somewhat gibbous, the limb 5-parted, dextrorsely convolute; anthers connivent and agglutinated to the stigma, the connective sagittate, truncate, or obtusely biauriculate; carpels 2, united at the apex; follicles 2, terete, dehiscent along the ventral suture; seeds truncate, comose.—A few other species are known from Central America.

Mandevilla hirsuta (A. Rich.) Schum. *Echites fluminensis* A. DC.; *Mandevilla fluminensis* Donn. Sm. In thickets, tierra caliente, ascending to the Meseta Central; Guanacaste; region of San Ramón; at 1,200 meters or less. Guatemala to Bolivia and Brazil. Stems hispid or glabrate; leaves petiolate, obovate-elliptic or oblong-elliptic, 5–20 cm. long, 2–8 cm. wide, abruptly acuminate, often deeply auriculate at the base, pilose on both surfaces; racemes equaling or longer than the leaves, the flowers reddish yellow; calyx lobes lanceolate to ovate-lanceolate, 5–10 mm. long; corolla funnelform, puberulent or pilose, the tube 2–3.5 cm. long, the throat 1.5–2

cm. long, the lobes about 1.5 cm. long; follicles conspicuously moniliform, 6–15 cm. long.

Mandevilla Pittieri Woodson, Ann. Mo. Bot. Gard. 23: 379. 1936. Forests of Tuis (cited incorrectly as "Luis" in the original description), 650 meters, *Pittier 11551*. Known only from the original collection. Plants suffrutescent and scandent, from a subtuberous rhizome; leaves petiolate, oblong-elliptic, 7–8 cm. long, 3–3.5 cm. wide, short-acuminate, broadly obtuse or rounded at the base, glabrous; calyx segments ovate, acuminate, 4.5–5 mm. long; corolla funnelform, glabrous outside, the tube 13 mm. long, the throat 14 mm. long, the lobes obliquely obovate, 16 mm. long.

Mandevilla subsagittata (R. & P.) Woodson. *Echites microcalyx* A. DC. Thickets of the Pacific slope, and perhaps elsewhere; region of San Ramón; chiefly at 900–1,300 meters. Mexico to Peru. A slender vine, glabrous or pubescent; leaves short-petiolate, mostly lance-oblong, sometimes oblong-elliptic, 5–10 cm. long, 1.5–3 cm. wide, usually long-acuminate, abruptly auriculate and almost subhastate at the base, glandular along the costa on the upper surface; calyx 1–1.5 mm. long, the lobes narrowly trigonous; corolla salverform, yellow, the tube 2–2.5 cm. long, the lobes broadly obovate, acuminate, 1–1.5 cm. long; follicles slender, conspicuously moniliform, 10–20 cm. long, glabrous.

Mandevilla veraguasensis (Seem.) Hemsl. Reported from Turrialba and San Pedro de La Calabaza, Atlantic tierra caliente. Extending to Ecuador. Leaves petiolate, broadly ovate to ovate-elliptic, 5–13 cm. long, 2.5–7 cm. wide, short-acuminate, broadly cordate at the base, glabrous above or nearly so, glandular at the base of the costa, minutely pilose or glabrate beneath; flowers purplish; calyx segments 3–6 mm. long, ovate-trigonous, acute; corolla funnelform, glabrous or minutely papillate outside, the tube 2–2.5 cm. long, the throat 1.5–2 cm. long, the lobes obovate, acuminate, 2.5–3 cm. long.

Mandevilla villosa (Miers) Woodson. Collected by Pittier along Río Toro Anarillo, Llanuras de Santa Clara, 300 meters. Southern Mexico to Venezuela. Similar to *M. subsagittata*, but the bracts of the racemes foliaceous or petaloid and 1–3.5 cm. long; in that the bracts are scarious and only 5–10 mm. long.

MESECHITES Muell. Arg.

Suffrutescent vines; leaves opposite, the lower surface with 1–4 inconspicuous glandular emergences clustered at the base of the

costa; inflorescence lateral, racemose; calyx segments 5, subequal, imbricate, bearing within several squamellae; corolla salverform, the tube straight, slightly dilated at the insertion of the stamens, the limb 5-parted, dextrorsely convolute; anthers included, connivent and agglutinated to the stigma, the connective sagittate, obtusely biauriculate; carpels 2, united at the apex; follicles terete, dehiscent along the ventral suture; seeds truncate, comose.—No other species is known from Central America.

Mesechites trifida (Jacq.) Muell. Arg. *Echites trifida* Jacq. Frequent in the tierra caliente, ascending to the region of San Ramón, at 1,200 meters or less; Guanacaste; growing usually in thickets. Guatemala to Brazil. Plants glabrous or nearly so; leaves petiolate, ovate to ovate-oblong, 5–12 cm. long, abruptly acuminate to obtuse, obtuse or rounded at the base and often more or less cordate; inflorescence branched; calyx lobes broadly oblong, obtuse, 3–5 mm. long; corolla greenish white or tinged with red or purple, the tube 1.5–2.5 cm. long, the lobes obliquely obovate-oblong, 7–15 mm. long; follicles 15–40 cm. long.

NERIUM L. Oleander

The species of the genus are natives of the Old World.

Nerium Oleander L. *Narciso.* Planted commonly for ornament. Native of the Mediterranean region. A shrub or small tree, the leaves mostly linear-oblanceolate, verticillate; flowers white or pink, often double, very fragrant, especially at night.

ODONTADENIA Benth.

Woody vines; leaves opposite, eglandular; inflorescences lateral or terminal and lateral, thyrsiform to simply scorpioid, bracteate, usually many-flowered; calyx 5-parted, the segments equal or unequal, squamellate within; corolla usually funnelform, the tube straight or nearly so, the limb 5-parted, dextrorsely convolute; anthers connivent and agglutinated to the stigma, the connective sagittate, narrowly bilobate; carpels 2, united at the apex; follicles 2, terete or laterally compressed, dehiscent along the ventral suture; seeds truncate, comose.—Two other species are listed for Central America.

Odontadenia Hoffmannseggiana (Steud.) Woodson. *O. speciosa* Benth. Río Coto, Pacific tierra caliente, collected by Pittier. Ranging to Peru. A large, glabrous vine; leaves short-petiolate, broadly elliptic to obovate-lanceolate, 13–22 cm. long,

shortly subcaudate-acuminate, acute to obtuse at the base; calyx segments broadly ovate, obtuse, 4–6 mm. long; corolla bright yellow, often tinged with red or orange, the tube 5–10 mm. long, the throat 2.5–3.5 cm. long, the lobes broadly acuminate, 2–3 cm. long; follicles stout, more or less falcate, 15–30 cm. long; seeds 3–4 cm. long. The plant probably grows also in the Atlantic tierra caliente.

PELTASTES Woodson

More or less woody vines; leaves opposite, peltate, petiolate, eglandular; inflorescence lateral, with few or several flowers; calyx 5-parted, the segments subequal, foliaceous, squamellate within at the base; corolla funnelform, large, the limb 5-parted, dextrorsely convolute; anthers connivent and agglutinated to the stigma, the connective sagittate; carpels 2, united at the apex; follicles 2, terete, acuminate, dehiscent along the ventral suture; seeds numerous, rostrate, comose.—No other species are known in North America. The plants may be recognized readily in the family by the peltate leaves.

Peltastes isthmicus Woodson. Collected at Nicoya by Tonduz. Panama. Stems ferruginous-lanulose when young; leaves long-petiolate, broadly ovate, 10–30 cm. long, abruptly short-acuminate, broadly rounded at the base, glabrate above, ferruginous-lanulose beneath when young; calyx lobes oblong-ovate, 3 cm. long; corolla glabrous outside, the tube 2.5 cm. long, the throat 2 cm. long, the lobes 3.5 cm. long; follicles 22–25 cm. long.

PLUMERIA L. Frangipani

Reference: Woodson, An evaluation of the genera *Plumeria* L. and *Himatanthus* Willd., Ann. Mo. Bot. Gard. 25: 189. 1938.

Trees or shrubs with very thick branches and abundant, milky latex; leaves alternate, petiolate; flowers large, bracteate, in terminal, pedunculate cymes, often produced when leaves are absent; calyx small, fleshy, 5-cleft, eglandular; corolla salverform, the 5 lobes sinistrorsely convolute; stamens included, the anthers obtuse, their sacs not appendaged; carpels 2, distinct; follicles 2, coriaceous, rather thick, usually divaricate; seeds compressed, winged.—A few other species are known from Central America.

Plumeria rubra L. *Cacalojoche, Flor blanca, Juche. P. Lambertiana* Lindl.; *P. acutifolia* Poir. Frequent on open hillsides of the Pacific tierra caliente; Guanacaste. Mexico to South America. A large shrub or small tree, seldom more than 9 meters high, deciduous,

the branchlets usually pubescent; leaves oblong to elliptic, 15–30 cm. long or larger, acute to long-acuminate, glabrous, with numerous parallel lateral nerves; corolla white or red, 6–7 cm. long, the slender tube equaling or shorter than the lobes; follicles thick, 10–25 cm. long, sometimes 4 cm. in diameter. This and other species of the genus are often planted for ornament in Central America, and in many other tropical regions of the earth. The large flowers are handsome and intensely fragrant. The corollas are firm and do not wither easily and on that account often are strung to make garlands used as decorations. The latex is said to contain rubber. As treated recently by Woodson, the usual cultivated, red-flowered plant of this relationship is typical *Plumeria rubra*, known in Central America, apparently, only in cultivation. The native plant with white flowers is f. *acutifolia* (Ait.) Woodson.

Plumeria bracteata DC. is listed by Pittier from La Caña Blanca, borders of Río Virilla, Pacific slope, *Pittier 2029*. No material has been seen of this number, which may be referable to *Himatanthus articulata* (Vahl) Woodson.

Plumeriopsis Ahouai (L.) Rusby & Woodson probably occurs in Costa Rica, since it is found in Central America both north and south, but I have seen no local specimens. It is related to *Thevetia*, but is distinguished by the salverform rather than funnelform corolla.

PRESTONIA R. Br.

Woody or suffrutescent vines; leaves opposite, eglandular; inflorescences lateral, racemose or corymbose, bracteate; calyx 5-parted, the segments equal or nearly so, with a solitary squamella within at the base of each; corolla usually salverform, the tube straight or almost so, usually with 5 epistaminal appendages within, the limb 5-parted, dextrorsely convolute; anthers connivent and agglutinated to the stigma, the connective sagittate; carpels 2, united at the apex; follicles 2, dehiscent along the ventral suture; seeds truncate, comose.—About nine other species are listed for Central America.

Prestonia isthmica Woodson, Ann. Mo. Bot. Gard. 18: 555. 1931. *P. longituba* Schum. in Engl. & Prantl, Pflanzenfam. 4, pt. 2: 188. 1895, nomen subnudum (Costa Rica, *Hoffmann 522;* photo. seen of type in herb. Berlin). Between Aserrí and Tarbaca, Prov. San José, 1,200–1,700 meters, *Standley 41332*. Frequent in thickets,

Meseta Central to the Pacific coast; Guanacaste; region of San Ramón. Endemic. A stout, woody vine, the stems ferruginous-tomentose; leaves short-petiolate, broadly obovate to oblong-elliptic, 9–20 cm. long, abruptly short-acuminate, obtuse or rounded at the base and more or less cordate, tomentulose beneath; calyx lobes ovate or ovate-lanceolate, acuminate, 2–2.5 cm. long; corolla villosulous outside, the tube 2.5–3.5 cm. long, the lobes short-acuminate, 13–17 mm. long; follicles 7–12 cm. long, hispid. Material of this species has been referred erroneously to *P. ipomoeifolia* A. DC. and *P. mexicana* A. DC.

Prestonia portobellensis (Beurl.) Woodson. *P. macrocarpa* Hemsl. Thickets of the tierra caliente; region of San Ramón, at 1,100 meters or less. Panama to southern Mexico. Stems glabrate; leaves short-petiolate, oblong-elliptic, 10–25 cm. long, obtuse to abruptly short-acuminate, obtuse or rounded at the base, glabrous; flowers purplish yellow; calyx lobes oblong-elliptic, acuminate, 11–17 mm. long; corolla glabrous or nearly so, the tube 11–17 mm. long, the lobes short-acuminate, 10–15 mm. long; follicles about 35 cm. long, glabrous.

Prestonia versicolor Woodson. Region of San Ramón, at 1,200 meters. Panama. Plants rather slender, glabrous; leaves short-petiolate, oval or oblong-elliptic, 10–17 cm. long, abruptly short-acuminate, obtuse or rounded at the base; calyx lobes oblong-elliptic, acute or acuminate, 8–10 mm. long; corolla glabrous, the tube 12–16 mm. long, the lobes short-acuminate, 7–9 mm. long. The flowers are said to be greenish.

RAUWOLFIA L.

Reference: Markgraf, Repert. Sp. Nov. 20: 111. 1924.

Shrubs, the leaves opposite or more often verticillate; flowers small, white or greenish, in pedunculate cymes; calyx 5-cleft, eglandular; corolla salverform, the 5 lobes sinistrorsely convolute; stamens included, the anthers obtuse, the sacs not appendaged; carpels 2, distinct or connate, with 2 ovules in each carpel; fruit of 2 drupes, these usually connate, very juicy.—Two or three additional species occur in Central America.

Rauwolfia canescens L. The typical form of the species is widely distributed in tropical America, and probably is to be found in Costa Rica, since it occurs both north and south. It is distinguished from var. *glabra* by having the leaves densely or sparsely pilose beneath. The species is represented in Costa Rica by the following variety:

Rauwolfia canescens var. **glabra** Muell. Arg. *Cohataco, Guataco. R. heterophylla* R. & S. Frequent in thickets or waste places of the Pacific tierra caliente; Guanacaste. Mexico to West Indies and northern South America. A branched shrub, usually 1 meter high or less; leaves verticillate, unequal, on very short petioles, membranaceous, oblong-obovate to broadly obovate, mostly 5–12 cm. long, broadly rounded to acute or short-acuminate at the apex, acute or obtuse at the base, glabrous or sometimes sparsely pilose beneath; flowers greenish white, in very small, dense, more or less pubescent cymes; calyx lobes rounded, ciliate, about 1.5 mm. long; corolla greenish white, in bud rounded at the apex, not elongate, the lobes definitely shorter than the tube; fruit 5–7 mm. in diameter, at first bright red, finally black. The shrub is a common one in many parts of Central America. The fruit has the reputation of being poisonous, which may well be the case, since many plants of the family are known to possess poisonous properties. The juice of the fruit is sometimes employed as a substitute for ink.

Rauwolfia indecora Woodson, Ann. Mo. Bot. Gard. 24: 12. 1937. Catalina, Guanacaste, 600 meters, *Stork 2800*. Collected in the same region also by Brenes; endemic. A shrub of 1–1.5 meters, the branchlets minutely puberulent; leaves ternate, subsessile, ovate, 1–2.5 cm. long, acuminate, obtuse at the base, glabrous above, minutely puberulent beneath; inflorescences 1–3-flowered; calyx lobes ovate-lanceolate, acuminate, 1–1.5 mm. long; fruit bluish black, about 8 mm. in diameter. Well marked by the very small leaves.

Rauwolfia mollissima Markgraf, Repert. Sp. Nov. 20: 119. 1924. Forests of Nicoya, *Tonduz 13940*. Thickets of the Pacific tierra caliente. Colombia. A shrub 1.5 meters high or less, the young branches pilose; leaves opposite or ternate, almost sessile, ovate or obovate, conspicuously unequal, 12 cm. long and 6 cm. wide or smaller, acute or acuminate, acute or obtuse at the base, densely pilose beneath; cymes many-flowered, small, pilose; calyx lobes acuminate, 1 mm. long; corolla white, pubescent, the tube 3 mm. long, the lobes of about the same length, the upper part of the corolla in bud elongate and narrowed, not globose; fruit 6–8 mm. in diameter, red at first, turning black.

Rauwolfia Woodsoniana Standl., sp. nov.—Frutex, ramis gracilibus glabris, internodiis solemniter elongatis subteretibus in sicco fuscis; folia plerumque ternata valde inaequalia breviter petiolata membranacea, petiolo glabro usque 7 mm. longo; lamina

elongato-lanceolato-oblonga vulgo 7–12 cm. longa 2–3 cm. lata longissime anguste attenuato-acuminata, basi attenuata, foliorum minorum interdum oblongo-elliptica atque multo brevior, glabra, nervis lateralibus utroque latere ca. 10; cymae axillares solitariae vel fasciculatae pauciflorae 1.5–3.5 cm. longe pedunculatae glabrae, pedicellis plerumque 2–3 mm. longis; calycis lobi subrotundati 2.5 mm. longi minutissime ciliolati; corolla extus glabra, tubo crasso 3 mm. longo, lobis rotundatis fere duplo brevioribus rotundatis, alabastro apice late rotundato.—La Calera de San Ramón, April, 1929, *Brenes 6801* (type in Herb. Field Mus.). The type specimen has been examined by Dr. Robert E. Woodson, who has remarked that it is either a new species of *Rauwolfia* or else a representative of a new genus. From other local species it differs conspicuously in its narrow leaves and elongate, lax inflorescence.

The genus *Rhabdadenia* is probably represented along the Atlantic coast by *R. biflora* (Jacq.) Muell. Arg., but no Costa Rican specimens or records have been found.

STEMMADENIA Benth.

Reference: Woodson, Ann. Mo. Bot. Gard. 15: 341. 1928.

Shrubs or small trees; leaves opposite, petiolate, the petioles meeting in a ring around the stem and enclosing numerous small, fusiform glands; inflorescence a terminal, reduced raceme of several flowers; calyx 5-parted, the lobes imbricate, unequal, bearing small, fusiform glands within; corolla large, funnelform or salverform, white or yellow, the lobes dextrorsely reflexed; stamens included, the anther sacs not appendaged; carpels 2; fruit of 2 divaricate, coriaceous follicles; seeds numerous, ecomose, immersed in a fleshy pulp.—A few other species are found in Central America.

Stemmadenia Alfari (Donn. Smith) Woodson, Ann. Mo. Bot. Gard. 15: 360. 1928. *Guijarro. Tabernaemontana Alfari* Donn. Smith, Bot. Gaz. 24: 396. 1897. Limoncito y Vuelta (Cañas Gordas), 1,100 meters, *Pittier 11094*. Frequent in forests, region of San Ramón; mountains of Guanacaste; at 600–1,100 meters. Endemic. A shrub or tree, 9 meters high or less; leaves short-petiolate, mostly oblong-elliptic, 7–11 cm. long, abruptly long-acuminate, acute to attenuate at the base, glabrous; corolla salverform, bright yellow, the tube 3–3.5 cm. long, the limb 1–1.5 cm. wide; calyx lobes 1.5–2 mm. long; follicles thick, 2–2.5 cm. long.

Stemmadenia Donnell-Smithii (Rose) Woodson. *Cojón de caballo. Tabernaemontana Donnell-Smithii* Rose; *T. Donnell-Smithii* var. *costaricensis* Donn. Smith, Bot. Gaz. 24: 397. 1897 (Río Toro Amarillo, Llanos de Santa Clara, 300 meters, *J. D. Smith 6646*). Plains of Santa Clara and tierra caliente of the Pacific coast; Guanacaste. Extending to Mexico. A shrub or small tree; leaves broadest above the middle, acuminate, 6–8 cm. long, minutely glandular-puberulent or glabrate above, barbate beneath in the axils of the nerves; corolla yellow, salverform, the tube 2.5–3 cm. long, the limb 1.5–2 cm. long; calyx 2–2.5 cm. long, the lobes 1.5–2 cm. wide; follicles 3.5 cm. long, 3 cm. broad, rounded at the apex.

Stemmadenia Galeottiana (A. Rich.) Miers. *Guijarro, Bijarro. S. insignis* Miers; *S. bella* Miers. Regions of San José and San Ramón, at about 1,100 meters. Southern Mexico. A shrub or tree of 10 meters or less; leaves obovate-elliptic, mostly 9–12 cm. long, acuminate, acute or attenuate at the base, glabrous or nearly so, short-petiolate; corolla yellow, the tube 8–10 mm. long, the throat 4–5 cm. long, 1–1.3 cm. wide, the limb 2.5–3 cm. long; calyx lobes 10–14 mm. long, 4–7 mm. wide; follicles 2–2.5 cm. long, 15–17 mm. broad. Pittier states that the sticky sap is sometimes used as bird-lime, for catching small birds. It is reported highly poisonous, and it is stated that use of ashes from the wood in treating corn for making tortillas has sometimes caused grave accidents.

Stemmadenia glabra Benth. *Huevos de caballo, Guijarro.* Regions of San José and Cartago, in thickets or hedges. Ranging to Honduras. A shrub or tree of 10 meters or less; leaves obovate-elliptic, 14–20 cm. long, acuminate, short-petiolate, glabrous; corolla funnelform, pale yellow or creamy white, the tube 2–2.5 cm. long, the throat conical, 2 cm. long, the segments 1.5–2.5 cm. long; calyx lobes 1.5–2.5 cm. long, 8–10 mm. wide; follicles 5 cm. long and 3–3.5 cm. broad. The sap is employed in Costa Rica for removing corns and as a remedy for toothache.

Stemmadenia grandiflora (Jacq.) Miers. *Tabernaemontana grandiflora* Jacq. Collected in Costa Rica by Tonduz, the locality unknown; to be expected in the tierra caliente of either coast. Mexico to Surinam. A shrub or small tree; leaves mostly 6–8 cm. long, acuminate, glabrous, short-petiolate; corolla yellowish white, salverform, the tube 3–3.5 cm. long, the limb 1.5–2 cm. broad; calyx lobes 10–15 mm. long and 8–12 mm. wide; follicles 3–3.5 cm. long, 2–3 cm. broad, acute.

Stemmadenia Greenmanii Woodson, Ann. Mo. Bot. Gard. 15: 360. 1928. San Ramón, 1,100 meters, in 1901, *Brenes 14275*. Known only from the region of San Ramón. A shrub or tree, 6 meters high or less; leaves 8–12 cm. long, acuminate, petiolate, glabrous; corolla yellowish white, funnelform, the tube 1.5 cm. long, the throat 2 cm. long and 8 mm. wide, the limb 1–1.5 cm. broad; calyx lobes 5–7 mm. long, 3–4 mm. wide.

Stemmadenia obovata (Hook. & Arn.) Schum. Collected at Salinas, in Guanacaste, and in the region of San Ramón, at 1,100 meters or less. Ranging to Mexico. A shrub or tree, 10 meters high or less; leaves oblong-obovate, 10–20 cm. long, abruptly caudate-acuminate, pubescent beneath and barbate in the axils of the nerves, glabrous above; corolla yellow, funnelform, the tube 1.5–2.5 cm. long, the throat 1.5–3 cm. long, 2–2.5 cm. broad at the orifice, the limb 1.5–2.5 cm. long; calyx lobes 1.5–2.5 cm. long, 8–10 mm. wide; follicles 4–4.5 cm. long, 3–3.5 cm. broad, acute.

Stemmadenia obovata var. **mollis** (Benth.) Woodson. *Güitil, Guijarro. S. mollis* Benth. Thickets of the Pacific tierra caliente, especially in Guanacaste. Southern Mexico to Bolivia. Similar to the typical form, but the leaves persistently tomentose on the upper surface.

Stemmadenia Robinsonii Woodson, Ann. Mo. Bot. Gard. 15: 369. 1928. Mountains of Talamanca, *Pittier 8617*. Atlantic tierra caliente, in forests. Endemic. A shrub or small tree; leaves oblong-elliptic or oblong-obovate, 12–16 cm. long, abruptly acuminate, short-petiolate, glabrous; corolla salverform, pale yellow, the tube 2–2.5 cm. long, the limb 1–1.5 cm. broad; calyx lobes linear-lanceolate, 1.5–2 cm. long, 3–4 mm. wide. The calyx is white in the fresh flowers, but becomes darkened in drying.

TABERNAEMONTANA L.

Shrubs or small trees, usually glabrous; leaves opposite, petiolate; flowers usually white, medium-sized or small, cymose; calyx 5-lobate, glanduliferous at the base within, the lobes imbricate; corolla salverform, the 5 lobes sinistrorsely contorted; stamens inserted on the corolla tube, the anthers sagittate, the sacs not appendaged; carpels 2; follicles short, coriaceous or fleshy, indehiscent.—A few other species are known from Central America.

Tabernaemontana amygdalifolia Jacq. *Cojón*. Occasional in thickets of the Pacific tierra caliente. Mexico to South America.

A shrub, usually 2 meters high or less, glabrous throughout; leaves slender-petiolate, elliptic to narrowly lance-oblong, 5–15 cm. long, acute to long-acuminate, acute at the base; corolla white, the tube about 1 cm. long, the lobes broad, spreading; tips of the anthers conspicuously exserted; cymes few-flowered, short-pedunculate; follicles 4–6 cm. long, 1.5–2 cm. thick.

Tabernaemontana aphlebia Standl., sp. nov.—Frutex 3-metralis omnino glaber, ramulis crassiusculis subteretibus ochraceis; folia petiolata chartacea, petiolo crassiusculo 2–2.5 cm. longo; lamina anguste oblanceolato-oblonga 13–23 cm. longa 4–6 cm. lata acuta vel breviter subacuminata, basin versus longe sensim attenuata et plus minusve ad petiolum decurrens, supra fusco-viridis, venis obsoletis, subtus multo pallidior, costa crassiuscula prominente, nervis vix manifestis tenerrimis angulo fere recto abeuntibus; inflorescentia multiflora ca. 5 cm. longe pedunculata, laxe ramosa, ramis basalibus divaricatis patentibus, pedicellis crassiusculis usque 8 mm. longis, bracteis minutis; calyx ca. 3 mm. longus, segmentis late rotundatis bene imbricatis; corolla glabra in alabastro apice anguste rotundata, tubo crasso 5 mm. longo, lobis aequilongis; antherae inclusae.—Cataratas de San Ramón, April, 1935, *Brenes 20551* (type in Herb. Field Mus.). La Hondura, Prov. San José, 1,300–1,700 meters, *Standley 36356*. Easily separated from other Costa Rican species by the obsolete lateral nerves of the leaves. The foliage is suggestive of that of *Psychotria uliginosa* Swartz.

Tabernaemontana chrysocarpa Blake. *Cachitor*. Occasional in thickets of the tierra caliente; reported also from the region of Dota; Guanacaste. Mexico and Central America. A glabrous shrub or small tree, sometimes 6 meters high; leaves large, short-petiolate, rather thick, oblanceolate-oblong to oblong-obovate or elliptic, 6–20 cm. long, acute or rounded and abruptly short-acuminate, attenuate to the narrow base; flowers white, in dense or lax, pedunculate, many-flowered cymes; corolla tube 6–8 mm. long, not inflated at the base; anthers included.

Tabernaemontana longipes Donn. Smith, Bot. Gaz. 24: 397. 1897. Hacienda de La Concepción, Llanuras de Santa Clara, 180 meters, *J. D. Smith 6650*. Forests of the Atlantic tierra caliente; apparently frequent in the region of San Ramón; at 1,650 meters or less. Endemic. A shrub or tree, sometimes 5 meters high, glabrous; leaves thin, obovate-oblong or elliptic-oblong, mostly 10–15 cm. long, abruptly acuminate, acute at the base; cymes usually long-peduncu-

late and almost equaling the leaves, few- or many-flowered; corolla white, the tube about 8 mm. long, somewhat inflated at the base; anthers included; follicles about 3 cm. long and slightly more than 1 cm. thick. A specimen collected at San Luis by Austin Smith is accompanied by the following notes: In forest shade, a common under-story tree; maximum size 6 meters in height, with a trunk diameter of 15 cm. Bark dull gray-olive. Freshly cut wood light yellow, giving off an abundant, milky sap. Flowers and buds amber-yellow, the flowers suggesting those of jasmine (*Jasminum*) in form.

THEVETIA Adans.

Shrubs or small trees, usually with thick branches and very abundant latex; leaves alternate, 1-nerved or pinnate-nerved; flowers large, yellow, in terminal cymes; calyx 5-parted, the segments glandular within at the base; corolla funnelform, the tube cylindric, abruptly expanded into the campanulate throat; anther sacs not appendaged; fruit drupaceous, broader than long, obcompressed, the endocarp nutlike, 2-celled, the seeds large, with acute edges.—One or two other species are known from Central America.

Thevetia ovata (Cav.) A. DC. *Chirca venenosa.* Thickets of Guanacaste. Mexico and Guatemala. A shrub of 3–4 meters; leaves petiolate, narrowly cuneate-oblong to broadly obovate, 6–11 cm. long, obtuse or rounded at the apex, attenuate to the base, thick, glabrate and lustrous above, densely and finely pubescent beneath; corolla 6–8 cm. long, the tube shorter than the throat; fruit 3.5–4 cm. broad, 2–3 cm. long. The seeds of this as of other species have the reputation of being highly poisonous.

Thevetia peruviana (Pers.) Merrill. *Chirca.* Planted frequently for ornament, and often found in hedges or thickets near settlements in the Meseta Central and along the Pacific tierra caliente. Widely distributed in tropical America, the original habitat doubtful; not a native of Central America. A small tree, sometimes 10 meters high, glabrous; bark gray; leaves linear, 7–15 cm. long; lustrous, long-attenuate at the base and apex; corolla bright yellow, 7 cm. long; fruit 3–4 cm. broad. The tree is a handsome and showy one when in flower. The flowers are very sweet-scented.

Thevetia plumeriaefolia Benth. *Chirca venenosa.* Region of Limón. Ranging to southern Mexico. A glabrous tree; leaves oblanceolate-oblong to oblong-obovate, 13–20 cm. long, 4.5–7 cm. wide, acute or abruptly short-acuminate, attenuate to the base, thick

and lustrous; corolla pale yellow, 4–5 cm. long, the tube longer than the throat; fruits bright red at maturity.

TONDUZIA Pittier

Trees or shrubs; leaves verticillate, narrow, more or less coriaceous; flowers small, in terminal or pseudoterminal, many-flowered cymes; calyx small, the 5 segments obtuse; corolla salverform, the lobes sinistrorsely convolute; anthers cordate-lanceolate, acute; carpels 2; follicles 2, terete, ventrally dehiscent; seeds numerous, compressed, ciliate.—Five other species are known, all Central American, except for one in Brazil. The genus was named for Adolfo Tonduz, Swiss by birth, who devoted most of his life to botanical exploration of Costa Rica.

Tonduzia parvifolia Pittier, Contr. U. S. Nat. Herb. 12: 103. *f. 5, 6.* 1908. Hacienda Belmira, near Santa María de Dota, 1,450 meters, *Tonduz 11619.* Frequent in thickets or forest of the central region, descending into the upper part of the Atlantic tierra caliente, 700–1,650 meters; region of San Ramón. Ranging to southern Mexico. A glabrous shrub or tree, sometimes 12 meters high, with a trunk 30–40 cm. in diameter; leaves dark green, lustrous, short-petiolate, linear-lanceolate, mostly 6–12 cm. long, long-acuminate or attenuate, attenuate at the base; flowers white, in rather dense, many-flowered cymes; calyx about 1 mm. long; corolla tube 4–5 mm. long, the lobes shorter; follicles slender, about 12 cm. long.

VALLESIA Ruiz & Pavón

Shrubs or small trees, glabrous or pubescent; leaves short-petiolate, alternate; flowers small, in pedunculate cymes opposite the leaves; calyx eglandular, small, with 5 short lobes; corolla salverform, the tube enlarged at the insertion of the stamens; anthers cordate, the sacs not appendaged; fruit a 1–2-seeded drupe; seeds naked.—One other Central American species occurs in Guatemala.

Vallesia flexuosa Woodson, Ann. Mo. Bot. Gard. 24: 14. 1937. Forests of the hills of Zarcero, 1,550 meters, *Brenes 4156.* Known only from the region of the type. A glabrous tree; leaves short-petiolate, obovate-oblong, 6–14 cm. long, 2.5–4 cm. wide, acuminate, obtuse or subtruncate at the base; calyx lobes acuminate, 1–1.5 mm. long; corolla tube 8–9 mm. long, the lobes obtuse, 3–4 mm. long. A recent collection by Austin Smith bears the following notes: Growing at upper limit of tropical zone. A small tree of scattered distribution; none seen more than 10 cm. in base diameter; trunk

gray-brown. Growing on hilltop at edge of woodland. Sap sticky but colorless. Flowers white, star-shaped. Fruits 25 mm. long and 15 mm. thick, pale cream-colored when mature.

ASCLEPIADACEAE. Milkweed Family

Perennial herbs, often scandent, sometimes shrubs or small trees, usually with a milky latex; leaves entire, without stipules, opposite or alternate; flowers perfect, regular, cymose or umbellate; calyx inferior, the sepals short-connate or almost distinct, imbricate or separated in bud; corolla rotate to campanulate, urceolate, or funnelform, 5-lobate, the lobes usually reflexed; a 5-parted or 5-lobate corona present between the corolla and stamens and adnate to one or the other; stamens 5, inserted on the corolla, the filaments short and stout, mostly connate; anthers attached by their bases to the filaments, introrsely 2-celled, connivent around the stigma or more or less united with each other, the anther sacs tipped with an erect or inflexed, scarious membrane, or unappendaged, sometimes appendaged at the base; pollen coherent into waxy or granular masses, one or rarely 2 such masses in each sac, connected with the stigma in 2's or 4's by 5 glandular corpuscles alternate with the anthers; disk none; ovary of 2 carpels, the styles 2, short, connected at the summit by the peltate, discoid stigma; ovules numerous, pendulous; fruit of 2 follicles, the seeds compressed, usually appendaged by a long, silky coma.—The family is noteworthy for the complicated structure of the flowers, more complicated, probably, than those of any other family of plants. The Mexican and Central American members of the group have never been monographed properly, and their classification is at present in a decidedly chaotic state. Fortunately, the Asclepiadaceae are much less abundantly represented in Central America than in Mexico.

ASCLEPIAS L. Milkweed

Perennial herbs, never scandent; flowers small or medium-sized, often brightly colored, umbellate; calyx segments small, acute, often glandular within; corolla deeply 5-parted, the segments usually valvate, reflexed in anthesis; corona column usually present; corona of 5 concave hoods, each having within it a slender or subulate, incurved horn; filaments connate into a tube, the anther wings broadened below; stigma almost flat, 5-angulate or 5-lobate; follicles acuminate, the seeds comose.—A few other species are known from Central America.

Asclepias curassavica L. *Viborrana.* Frequent along roadsides or in pastures, Meseta Central and occasionally in the tierra caliente. Generally distributed in tropical America. An erect, usually simple herb, a meter high or less, glabrous or nearly so; leaves opposite, short-petiolate, oblong to narrowly lanceolate, 5–12 cm. long, long-acuminate; flowers showy, the corolla lobes red-purple, the inner flower parts orange-yellow; follicles glabrous or pubescent, 3–10 cm. long. Var. *flava* Kuntze, with all the flower parts orange-yellow, occurs occasionally about Cartago. The plant is one of the common weeds of Central America, and the only species of the genus at all common there. In Costa Rica the latex is sometimes applied to warts, to destroy them, just as that of other species is employed in the United States. Pittier reports the Brunka name as Kin-shi-krá.

Asclepias glaucescens HBK. In pastures or on dry hillsides, Meseta Central and Pacific tierra caliente, but apparently infrequent. Ranging to northern Mexico. Plants stout, erect, glabrous or nearly so, the stems and lower leaf surfaces usually glaucescent; leaves sessile, thick, oblong to linear-oblong, obtuse or subacute; flowers dirty white, the sepals pinkish; pedicels pilose.

Asclepias longicornu Benth. *Leche de perro.* Paso Tempisque, Guanacaste, 80 meters, *Stork 4021.* Extending to Mexico. Plants low, stout, erect, not glaucous, the stems villosulous; leaves petiolate, lance-oblong, narrowed to an obtuse or rounded apex, sparsely villosulous and rough to the touch; umbels few-flowered, short-pedunculate, the flowers large, pale green, the hoods long-stipitate.

Asclepias mexicana Cav. In pastures, La Cruz de Guanacaste, 250 meters, *Pittier 2796.* Extending to Mexico; rare in Central America and perhaps known only from Costa Rica. A slender perennial, the stems glabrous or glabrate; leaves linear, opposite or verticillate, glabrous or nearly so; umbels few, the pedicels puberulent; flowers greenish white. The collection was determined originally by Captain Smith as *A. verticillata* L. var. *subverticillata* Gray.

BLEPHARODON Dcne.

Slender vines, herbaceous or suffrutescent, glabrous; leaves opposite, not cordate, petiolate, usually subcoriaceous; flowers small or medium-sized, umbellate; calyx 5-parted, 5-glandular within at the base; corolla rotate, 5-lobate, the lobes usually valvate and ciliate; corona scales 5, adnate to the stamen tube, concave; stamens

attached to the base of the corolla, the filaments connate into a short tube, the anthers terminated by an inflexed membrane, with long basal auricles; stigma depressed or umbonate; follicles short, thick, smooth.—No other species are known from Central America.

Blepharodon mucronatum (Schlecht.) Dcne. Thickets of the Pacific slope, at middle elevations; region of San Ramón; Atlantic tierra caliente. Extending to Mexico. Leaves short-petiolate, oblong to elliptic, 3–7 cm. long, cuspidate, obtuse or rounded at the base, pale beneath; umbels pedunculate, few-flowered, the pedicels filiform; corolla 1 cm. broad, greenish, the lobes lance-oblong, obtuse, glabrous outside, papillose within toward the tips; corona lobes oval, obtuse, shorter than the gynostegium.

CYNANCHUM L.

Slender vines, herbaceous or suffrutescent, glabrous or pubescent; leaves usually petiolate, small or large; flowers small, often minute, umbellate, yellowish green or greenish white; calyx 5-lobate, often glandular within, the lobes acute or obtuse; corolla campanulate-rotate, the lobes contorted; corona attached to the stamen tube, shallowly lobate; stigma conic; follicles slender, smooth.—A few other species probably are to be found in Central America.

Cynanchum reflexum (Hemsl.) Pittier. Las Vueltas de Tucurrique, 600–700 meters, collected by Tonduz (see Pittier, Contr. U. S. Nat. Herb. 13: 100. 1910). Nicaragua. Stems villous; leaves densely strigose-pilose, short-petiolate, ovate-lanceolate, 6–10 cm. long, acuminate, rounded at the base; umbels about 4-flowered, almost sessile, the pedicels 2–3 cm. long; calyx 4–4.5 mm. long, the lobes narrowly lanceolate; corolla greenish, sparsely pilose outside, the lobes 7.5 mm. long, 3 mm. wide.

Cynanchum sepium (Dcne.) Standl. Frequent in thickets or forests of the central region, mostly at 1,200–2,800 meters; region of San Ramón; mountains of Guanacaste, at 600–700 meters. Ranging to Mexico. A very slender vine, the branches sparsely puberulent or glabrous; leaves slender-petiolate, narrowly lanceolate to ovate-lanceolate, mostly 3–5 cm. long, narrowly long-attenuate, obtuse or acute at the base, sparsely puberulent above; umbels pedunculate or subsessile, mostly 4–6-flowered, the flowers greenish white, about 1.5 mm. long, the buds globose; follicles very slender, attenuate, about 4 cm. long.

EXOLOBUS Fourn.

Scandent herbs, the leaves opposite, petiolate, cordate; flowers rather large, in axillary, umbelliform cymes; calyx small, glandular within, the lobes acute or acuminate; corolla rotate, the lobes narrow, dextrorsely convolute; corona double, the outer ringlike, ciliate, the inner of 5 distinct scales; anthers membranous-appendaged at the apex; stigma flat; follicles large, ovoid, 5-costate.—No other species are known from Central America. The genus is similar to *Vincetoxicum*, being separated by the ciliate outer corona.

Exolobus marginatus Pittier, Contr. U. S. Nat. Herb. 13: 108. *f. 16*. 1910. Chirripó Farm, Plains of Zent, Atlantic coast, *Pittier 16040*. Thickets of the Atlantic tierra caliente. Panama. A large, slender vine, the stems short-hirsute; leaves slender-petiolate, broadly ovate to lance-oblong, mostly 5–9 cm. long, acuminate, deeply and openly cordate at the base, glabrate above, somewhat paler beneath and sparsely pubescent; peduncles short, the pedicels 2–4 cm. long, pubescent; sepals lanceolate, 1 cm. long, densely pubescent outside; corolla 4 cm. broad, the lobes linear-lanceolate, attenuate, 4 mm. wide or less, pubescent outside, almost glabrous within.

FIMBRISTEMMA Turcz.

Plants scandent, suffrutescent, pilose; leaves opposite, cordate; flowers in many-flowered, trichotomous or laxly few-flowered cymes, the inflorescence short-pedunculate; calyx 5-parted, with narrow segments; corolla subrotate-campanulate, deeply 5-lobate, the lobes oblong; corona attached to the stamen tube, cyathiform, hyaline, the 5 outer lobes alternate with the stamens, fimbriate in the sinuses, the inner corona 5-lobate and everywhere fimbriate; stamens attached to the corolla tube, the anthers unappendaged; stigma depressed.—Two other species are listed from Central America.

Fimbristemma Warscewiczii (Karst.) Hemsl. Biol. Centr. Amer. Bot. 2: 336. 1882. *Callaeolepium Warscewiczii* Karst. Fl. Columb. 2: 123. *pl. 165*. 1866. Type collected by Warscewicz in Costa Rica or Guatemala. A slender, pubescent vine; leaves ovate-cordate, 5 cm. long, acute, paler and subhirsute beneath; cymes many-flowered, shorter than the leaves; flowers 1 cm. broad, pedicellate; calyx lobes linear-lanceolate, acute; corolla pale pink, glabrous.

FISCHERIA DC.

Large vines, herbaceous or suffrutescent; leaves opposite, more or less cordate; cymes umbelliform or short-racemose, the flowers

rather large, usually dark brown-purple; calyx 5-parted, glandular within, the segments usually narrow; corolla subrotate, the lobes contorted in bud; outer corona annular, fleshy, adnate to the corolla, the interior corona of 5 fleshy, obtuse scales; stigma depressed.—One or two other species are known from Central America.

Fischeria funebris (Donn. Smith) Blake, Journ. Wash. Acad. Sci. 14: 293. 1924. *F. Martiana* Dcne. var. *funebris* Donn. Smith, Bot. Gaz. 24: 398. 1897. Chilamate, Río Sarapiquí, *Biolley 7385.* Frequent in thickets and forests of the tierra caliente; region of San Ramón, at 1,000 meters or less; Guanacaste. Panama to Honduras. A large vine, the stems densely hispid; leaves slender-petiolate, oblong to rather broadly elliptic, mostly 9–16 cm. long, thin, caudate-acuminate, rounded or obtuse at the base and auriculate, densely hirsute; umbels long-pedunculate, few-flowered, the flowers long-pedicellate, often short-racemose; sepals linear or lance-linear, as much as 15 mm. long.

FUNASTRUM Fourn.

Herbaceous or suffrutescent vines, glabrous or pubescent; leaves petiolate, often auriculate at the base; flowers medium-sized, white or purplish, in axillary, umbelliform cymes; calyx small, 5-parted; corolla subrotate, 5-lobate, the lobes contorted in bud; exterior corona annular, adnate to the corolla, the interior corona of 5 broad, fleshy scales; follicles usually slender, smooth, terete.—One or two other species are found in Central America.

Funastrum clausum (Jacq.) Schlechter. *Mata-tórsalo. Philibertia crassifolia* Hemsl. Thickets of the Atlantic tierra caliente; region of El General. Mexico to northern South America. A slender vine; leaves short-petiolate, lance-oblong to elliptic, 3–7 cm. long, acuminate or cuspidate, obtuse or rounded at the base, glabrous or sometimes pubescent beneath; umbels long-pedunculate, many-flowered, the flowers 10–14 mm. broad, whitish, sericeous outside; follicles 5–6.5 cm. long, about 1 cm. thick. The crushed leaves are applied at the point in the skin where the larva of the dipterous insect known as *tórsalo* is located, and the latter is soon killed by the acrid sap. The tough stems are often used in Central America as a substitute for string.

Funastrum odoratum (Hemsl.) Schlechter. Reported from Surubres, near San Mateo, collected by Biolley. Guatemala. Plants hirsute; leaves long-petiolate, orbicular-cordate, 3.5–5 cm. long,

abruptly linear-acuminate, pilosulous above, paler and densely pubescent beneath; flowers 14–16 mm. broad, in 6–12-flowered umbels, the pedicels 12–16 mm. long; calyx lobes 6 mm. long; corolla pilose outside, the lobes ovate-oblong, obtuse.

Funastrum reflexum (Pittier) Schlechter, Repert. Sp. Nov. 13: 287. 1914. *Philibertia reflexa* Pittier, Contr. U. S. Nat. Herb. 13: 96. *f. 2.* 1910. Near Nicoya, *Pittier* in 1903. Known only from the original collection. Glabrous almost throughout; leaves petiolate, ovate-cordate, 3–5 cm. long, long-acuminate, paler beneath; umbels many-flowered, the pedicels 2.5–3 cm. long; calyx lobes ovate, obtuse, 3–4 mm. long; corolla about 2 cm. broad, the lobes oblong-lanceolate, rounded at the apex.

MARSDENIA R. Br.

Reference: Rothe, Bot. Jahrb. 52: 354–434. 1915.

Plants scandent, usually somewhat frutescent, glabrous or pubescent; leaves opposite, usually more or less cordate; flowers small or medium-sized, in umbelliform cymes; calyx 5-parted, glandular within, the lobes acute or obtuse; corolla campanulate, the throat usually villous, the lobes contorted, appendages sometimes present in the sinuses; corona scales 5, adnate to the stamen tube; stigma depressed or rostrate; follicles thick, usually smooth.—A few other species are listed for Central America.

Marsdenia Brenesii Standl., sp. nov.—Frutex scandens, caulibus ochraceis striatis, novellis pilis incurvis vel subadpressis brevibus dense pilosis; folia modica graciliter petiolata membranacea, petiolo 2–3 cm. longo incurvo-pilosulo; lamina late cordato-ovata ca. 9 cm. longa atque 6 cm. lata abrupte breviter cuspidato-acuminata, acumine angusto ca. 1 cm. longo attenuato, basi profunde late cordata, utrinque dense pilis brevibus subpatentibus molliter pilosa, subtus pallidior arcte reticulato-venosa; flores cymosi, cymis breviter pedunculatis dense multifloris petiolo brevioribus ramosis, ramis dense pilosulis, floribus breviter pedicellatis; calycis lobi late oblongi obtusi puberuli adpressi; corolla in alabastro ovoidea extus glabra fere 3 mm. longa intus dense barbata; styli rostrum breve conicum obtusum.—Isla del Caballo, Pacific coast, June, 1932, *Brenes 15685* (type in Herb. Field Mus.). The relationship of this probably endemic species is with the Mexican *M. Bourgaeana* (Baill.) Rothe and *M. Coulteri* Hemsl.

Marsdenia Engleriana Rothe, Bot. Jahrb. 52: 419. *f. 6.* 1915. Type collected in Costa Rica, *Warscewicz 237* (photo. and fragment of the type seen, ex herb. Berlin). Regions of Nicoya and San Ramón. Endemic. A large, somewhat woody vine, the stems glabrous; leaves short-petiolate, oblong-ovate or oblong-oval, mostly 6–12 cm. long, rounded at the apex and sometimes abruptly short-acuminate, rounded at the base or subcordate, glabrous above, beneath more or less tomentose or pilose; inflorescences umbelliform, many-flowered, very dense and headlike, the pedicels stout, short; calyx lobes obovate, acutish, pilosulous; corolla fleshy, glabrous outside, about 7 mm. long; beak of the stigma slender and elongate. Rothe describes the leaves as glabrous but in fragments of the type that I have examined they are actually finely and rather densely pubescent beneath. Some of the Costa Rican material has been referred to *M. propinqua* Hemsl., to which *M. Engleriana* is closely related if, indeed, it is distinct.

Marsdenia laxiflora Donn. Smith. Reported from Nicoya, collected by Tonduz. Guatemala and British Honduras. Glabrous throughout; leaves short-petiolate, lance-oblong, 7–15 cm. long, narrowly long-acuminate, acute at the base; inflorescences very lax, on long, slender peduncles, about equaling the leaves, the pedicels long and slender; calyx lobes ovate, obtuse; corolla subrotate, 1 cm. broad or more, the lobes oblong, obtuse. In appearance this is unlike other species of *Marsdenia*. Rothe placed it among the doubtful and excluded species, stating that it probably represented a new genus.

Marsdenia macrophylla (Humb. & Bonpl.) Fourn. Mountains of Guanacaste, 600 meters, in forest. Mexico to Venezuela. A large, woody vine, glabrous throughout or nearly so; leaves short-petiolate, ovate to elliptic or oval, 7–15 cm. long or more, acute or abruptly short-acuminate, rounded or subcordate at the base, glabrous, pale beneath; cymes many-flowered, short-pedunculate, dense and headlike; calyx lobes obtuse; corolla yellowish, 5–6 mm. long, sometimes dark purple within.

Marsdenia nicoyana Pittier, Contr. U. S. Nat. Herb. 13: 102. *f. 11.* 1910. *Bejuco de sapo.* Nicoya, *Tonduz13909.* Known only from the original collection. Leaves petiolate, elliptic-ovate, 5–10 cm. long, 2–5 cm. wide, short-acuminate, rounded at the base, glabrous, glaucous beneath; flowers greenish, the umbels pedunculate; calyx 4 mm. long, the lobes rounded, pilose and ciliate; corolla 4–7 mm.

long, glabrous outside; stigma obtusely pointed. There is little difference, apparently, between this and *M. Engleriana*, and it is probable that the latter should be reduced to synonymy.

METASTELMA R. Br.

Slender, herbaceous vines; leaves small, opposite, not cordate; flowers very small, whitish or greenish, in axillary, umbelliform cymes; calyx 5-parted, usually glandular in the sinuses; corolla campanulate or subrotate, deeply 5-lobate; corona simple, 5-parted, with narrow segments; gynostegium sessile or stipitate; stigma flat; follicles small, slender, smooth.—A few other species have been recorded for Central America.

Metastelma(?) filisepalum Standl., sp. nov.—Suffrutex scandens, caulibus gracillimis teretibus dense hirtellis, internodiis foliis brevioribus vel longioribus; folia parva breviter petiolata membranacea in sicco fusco-viridia, petiolo 1–2 mm. longo hirtello; lamina late ovata vel elliptico-ovata, interdum oblongo-ovata, 8–17 mm. longa 7–10 mm. lata, obtusa et breviter apiculata, interdum acuta, basi truncata vel subcordata, supra sparse puberula vel pilosula, subtus pallidior sparse breviter pilosula, costa prominula, nervis lateralibus utroque latere ca. 3; inflorescentiae axillares simpliciter umbellatae vel ramosae graciliter pedunculatae, pedicellis plerumque 5–8 mm. longis gracillimis pilis brevibus adscendentibus albidis pilosulis, bracteis linearibus brevibus; sepala filiformi-linearia 3–4 mm. longa patentia vel adscendentia incurvo-puberula; corolla extus glabra vix ultra 2 mm. longa, lobis oblongis apice rotundatis intus glabris recurvis.—Entre San Ramón y La Palma de San Ramón, June, 1928, *Brenes 6179* (type in Herb. Field Mus.). The plant is a curious one, noteworthy for the filiform and relatively much elongate sepals, which greatly surpass the corolla in bud as well as in anthesis. I have found no similar calyx in any American member of the family.

Metastelma pedunculare Dcne. *M. sepicola* Pittier, Contr. U. S. Nat. Herb. 13: 98. *f. 5.* 1910 (hedges near San José, 1,150 meters, *Tonduz 10130*). Regions of San José and Cartago, mostly at 1,100–1,300 meters, in hedges or thickets. Ranging to southern Mexico. Stems very slender, bifariously puberulent; leaves on short, slender petioles, lance-oblong to oval, 1.5–3 cm. long, acute or acuminate, rounded at the base, glabrous or nearly so; umbels few-flowered, on short or elongate peduncles, the flowers greenish white, 2–3 mm. long; gynostegium distinctly stipitate; corona scales liguli-

form; follicles very slender, about 4.5 cm. long. Monographic work on the genus may show that *M. sepicola* is a distinct species, endemic in Costa Rica, but the Costa Rican material seems to agree well enough with type material of *M. pedunculare*, which was described from Guatemala.

OXYPETALUM R. Br.

Herbaceous vines, the leaves opposite, cordate; flowers rather large, in umbelliform cymes; calyx 5-parted; corolla with a short-campanulate or subglobose tube and 5 very narrow, elongate lobes; corona scales 5, erect; stamens borne at the base of the corolla tube, the filaments connate, the anthers with a membranous appendage; stigma 2-cleft or 2-parted; follicles smooth or tuberculate.—No other species have been found in Central America.

Oxypetalum cordifolium (Vent.) Schlechter. *O. riparium* HBK. Collected at Aguacate, and in the regions of San Ramón and El General, at 1,050 meters or less. Mexico to West Indies and South America. Plants rather slender, velutinous-pilose almost throughout; leaves slender-petiolate, ovate-cordate, 5–10 cm. long, cuspidate-acuminate, deeply cordate at the base, paler beneath; umbels few-flowered, the flowers yellowish, on elongate pedicels; calyx lobes linear-lanceolate; corolla lobes linear-attenuate, 1.5–2 cm. long; follicles about 8 cm. long, long-acuminate.

VINCETOXICUM Walter

Herbaceous or suffrutescent vines; leaves opposite, petiolate, usually cordate; flowers rather large, mostly green or purple-brown, in axillary, umbelliform cymes; calyx 5-parted, usually 5-glandular within; corolla rotate, 5-parted, the tube very short, the lobes convolute in bud; corona double, annular or cupuliform, adnate to the corolla; stamens inserted at the base of the corolla, the filaments connate; anthers not appendaged, inserted along or just below the margin of the flat-topped stigma; follicles thick, acuminate, smooth or tuberculate, often angulate.—Other species are known from Central America.

Vincetoxicum dubium (Pittier) Standl. Journ. Wash. Acad. Sci. 17: 14. 1927. *Gonolobus dubius* Pittier, Contr. U. S. Nat. Herb. 13: 106. *f. 15.* 1910. Jericó Farm, Llanuras de Santa Clara, 300 meters, *Pittier 13416*. Leaves on slender, minutely pubescent petioles 2–4 cm. long, ovate-acuminate, 4–7 cm. long, 2–5 cm. wide, cordate at the base, with rounded auricles, glabrate above, sparsely

pilose beneath, the veins minutely hirsute; umbels 1–4-flowered, the pedicels minutely pubescent, the peduncles 1–2 cm. long; calyx lobes lance-acuminate, 1 cm. long, minutely pubescent outside; corolla 3–4 cm. in diameter, stellate-pubescent outside, glabrous within, greenish yellow, the lobes longitudinally striate with darker lines, narrowly triangular-acuminate, the exterior corona reduced to a ciliate ring, the inner corona of 5 fleshy scales.

Vincetoxicum edule (Hemsl.) Standl. *Cuayote, Guayote. Gonolobus edulis* Hemsl. Frequent in thickets of the central region at middle elevations; region of Dota. Extending to southern Mexico. Stems sparsely or densely pilose with rather long, spreading hairs; leaves slender-petiolate, broadly ovate to oblong-lanceolate, mostly 5–7 cm. long, acuminate, shallowly and broadly cordate at the base, soft-pilose, dark green above, paler beneath; umbels mostly 3–5-flowered, pedunculate, the pedicels 1–3 cm. long; calyx lobes pilose outside, lanceolate, about 1 cm. long; corolla yellowish green, pubescent outside, white-lanate within near the base, the lobes 12–14 mm. long or more, broadly lanceolate; outer corona 5-lobulate, the inner of 5 trapezoid scales; fruits large, longitudinally winged. The young and tender fruits of this species, and probably of the others listed here, are sometimes cooked and eaten.

Vincetoxicum magnifolium (Pittier) Standl. Contr. U. S. Nat. Herb. 23: 1188. 1924. *Gonolobus magnifolius* Pittier, Contr. U. S. Nat. Herb. 13: 104. *f. 13.* 1910. Forests of Las Vueltas de Tucurrique, Reventazón Valley, 700 meters, *Tonduz 13022.* Collected also at Tuis. Southern Mexico. Stems hirtellous and puberulent; leaves rounded-cordate, 13–24 cm. long, acute or acuminate, densely pubescent; cymes few-flowered, the peduncles 5–8 cm. long, the pedicels 5–6 cm. long or less; calyx lobes broadly elliptic, 10–14 mm. long, obtuse; corolla brownish or greenish, 4 cm. broad, pubescent outside, glabrous within; outer corona ringlike, the inner corona thick, torulose, with 5 erect, rounded lobes.

Vincetoxicum pseudobarbatum (Pittier) Standl. Journ. Wash. Acad. Sci. 17: 14. 1927. *Gonolobus pseudobarbatus* Pittier, Contr. U. S. Nat. Herb. 13: 105. *f. 14.* 1910. Cerro de San Isidro, near San Ramón, 1,300 meters, in 1901, *Brenes 14504.* Known only from the original collection. Stems pilose with long and short hairs; leaves slender-petiolate, rounded-ovate to ovate-lanceolate, 4–6 cm. long, 2–4.5 cm. wide, acuminate, cordate at the base, sparsely pilose on the upper surface, pale beneath, covered with minute, purple, glandlike

hairs, pilose on the veins; umbels 6–10-flowered, the peduncles 2 cm. long, the pedicels 3 cm. long; calyx lobes lanceolate, acute, 5 mm. long, densely long-pilose; corolla lobes ovate, obtuse, 7 mm. long, greenish yellow with dark veins, covered outside with long, soft hairs, glabrous inside except on the villous right-hand margin; corona fleshy, torulose, with 5 spatulate appendages.

Vincetoxicum Quirosii Standl., sp. nov.—Suffrutex scandens, caulibus gracilibus teretibus dense furfuraceo-puberulis et breviter hirtellis, quoque pilis longis patentibus fulvis sat dense hirsutis, internodiis elongatis; folia longipetiolata membranacea, petiolo gracili 3–5 cm. longo sicut caulis induto; lamina late rotundato-cordata ca. 6 cm. longa atque 4 cm. lata subabrupte acuminata, basi profunde cordata, sinu anguste rotundato, lobis late rotundatis, supra viridis, dense pilis longis et brevibus intermixtis rigidulis pilosa, subtus paullo pallidior dense breviter velutino-pilosa, glanduloso-puberula; pedunculi longi graciles, floribus paucis (1–3) longi-pedicellatis, pedicellis usque 2.5 cm. longis; calyx pallide viridis fere ad basin partitus, lobis oblongo-lanceolatis acuminatis 8 mm. longis longiciliatis trinerviis extus sparse pilosis; corolla fere 2.5 cm. lata extus puberula, intus glabra atque ubique arcte conspicue reticulato-venosa, venis brunneo-purpureis, breviter lobata, lobis late triangularibus subobtusis.—Manzanillo, Puntarenas, June, 1937, *Manuel Quirós C. 732* (type in Herb. Field Mus.). Near Cañas, Guanacaste, 125 meters, June, 1930, *Brenes 12685*.

Gonolobus reflexus Hemsl. is listed by Pittier as occurring in the Atlantic tierra caliente, but I have seen no specimens from Costa Rica. It is a Nicaraguan species that is to be expected here.

Vincetoxicum Rothschuhii (Schlechter) Standl., comb. nov. *Gonolobus Rothschuhii* Schlechter in Loes. Bot. Jahrb. 60: 368. 1926. In thickets, region of San Ramón; mountains of Tilarán; at 600-1,200 meters. Nicaragua, whence originally described. A stout vine, the stems hispid with long, spreading, stiff hairs; leaves on long or short petioles, narrowly oblong to oblong-elliptic, mostly 7–15 cm. long, narrowly long-acuminate, rounded or subtruncate at the base, hispid; umbels few-flowered, sessile or short-pedunculate, the pedicels hispid; calyx lobes lanceolate or linear, 7–10 mm. long, usually reflexed; corolla green outside, purplish within, about 13 mm. long, the lobes oblong-lanceolate, subacute, glabrous within, puberulent or hispidulous outside. Easily recognized by the abundant, hispid pubescence.

Vincetoxicum viridiflorum (Mey.) Standl. Region of San Ramón, El General, and elsewhere on the Pacific slope, at low or middle elevations; reported from Cartago. Extending to northern South America. A slender vine, the stems short-hirsute; leaves on long, slender petioles, oblong-elliptic to broadly elliptic, mostly 7–10 cm. long, acuminate, rounded at the base and auriculate, dark green and glabrate above, pale beneath and inconspicuously pubescent; umbels short-pedunculate or subsessile, few-flowered, the pedicels elongate; sepals lanceolate, 6 mm. long; corolla yellowish green, about 1.5 cm. long, glabrous outside or nearly so, thinly short-pilose within, conspicuously reticulate-veined.

CONVOLVULACEAE. Morning-glory Family

Herbs, rarely shrubs or trees, usually scandent; leaves alternate, without stipules, simple or compound; flowers small or large, perfect, regular or nearly so, axillary and solitary or cymose; calyx gamosepalous and 5-lobate or of 5 distinct sepals; corolla gamopetalous, generally with an elongate tube and a 5-lobate, angulate, or entire limb; stamens 5, inserted in the tube of the corolla, alternate with the lobes; ovary superior, 2–6-celled; fruit capsular or baccate.—One or two other genera are represented in Central America.

ANISEIA Choisy

Prostrate or twining herbs; leaves linear to ovate, often mucronate; flowers axillary, solitary or in few-flowered inflorescences; sepals herbaceous, unequal, the 3 outer ones larger and often decurrent as wings on the pedicels; corolla funnelform, with 5 hairy bands outside; stamens and style included; ovary 2-celled, with 2 ovules in each cell; stigma biglobular; capsule globose, 4-valvate, 4-seeded.—No other species are known from Central America.

Aniseia martinicensis (Jacq.) Choisy. Wet thickets of the Pacific coast, collected only by Brenes. Widely dispersed in tropical America. Plants glabrous or sparsely sericeous-pilose, forming dense tangles; leaves short-petiolate, oblong-lanceolate or oblong-elliptic, obtuse or emarginate and mucronate, acute at the base, 3–8 cm. long; peduncles 1–3-flowered; outer 3 sepals decurrent upon the pedicel, 1.5–2 cm. long; corolla white, 2.5 cm. long; capsule 1.5–2 cm. long.

CALONYCTION Choisy. Moon-vine

Scandent herbs, the stems sometimes aculeolate; leaves large, cordate, with elongate petioles, entire; flowers large, axillary, solitary or cymose, the pedicels thickened above; sap milky; sepals glabrous;

corolla large, the tube slender and greatly elongate, or enlarged above; stamens included or exserted; capsule 4-valvate, 4-seeded.—One or more additional species grow in Central America.

Calonyction aculeatum (L.) House. *Flor de luna, Bejuco trompeta.* In thickets, Meseta Central to the coasts; region of San Ramón. A species of wide distribution. A large or small vine, the stems usually provided with fleshy, spinelike protuberances; sepals terminated by long, slender, fleshy appendages; corolla white, the tube 8–12 cm. long; stamens exserted. A beautiful plant because of its large, pure white flowers. The corolla opens rapidly just before nightfall, and closes early the following morning. The vine is cultivated in many parts of the world for ornament. In some regions of Central America the latex is employed for coagulating the native rubber (*Castilla*).

Calonyction clavatum Don. Thickets of the Pacific tierra caliente; sometimes planted for ornament. Widely distributed in tropical America. A large vine, the stems and petioles hirsute with long, spreading hairs; leaves broadly cordate, entire or angulate, acuminate, glabrous or nearly so; corolla blue and white, as much as 15 cm. broad, or smaller, very showy; sepals acute, not appendaged at the apex.

Calonyction ventricosum Hallier. Vicinity of San José and Santa María de Dota, and elsewhere on the Pacific slope. Extending to Guatemala and Mexico. A large, glabrous vine, the stems smooth; sepals 1 cm. long or larger, not appendaged; corolla white, 7–8 cm. long, the tube enlarged above.

CUSCUTA L. Dodder

Reference: Yuncker, Revision of the North American and West Indian species of *Cuscuta*. 1921.

Parasitic herbs, scandent over herbs and shrubs, the very slender stems yellow or orange, the leaves reduced to small scales; flowers small, in dense or open cymes; calyx with 5 lobes or sepals; corolla white, campanulate or urceolate, with small, fimbriate or crenulate scales within alternating with the lobes; capsule small, irregularly dehiscent or circumscissile.—A few other species occur in Central America. In some parts of the world certain species of the genus do much damage to cultivated plants, especially clover, alfalfa, beets, and peppers (*Capsicum*). In Central America the name Fideos is sometimes given to the plants. The seeds of *Cuscuta* germinate in

the soil, the young plant soon becoming attached to some host, from which it thereafter extracts all its nourishment, the attachment to the soil being quickly lost. Some authors place the genus in a separate family, Cuscutaceae.

Cuscuta corymbosa Ruiz & Pavón, var. **grandiflora** Engelm. Occasional in the Meseta Central. Mexico and Central America, the typical form of the species in South America. Flowers large, 5–7 mm. long, in open cymes; corolla lobes obtuse; capsule circumscissile.

Cuscuta glandulosa (Engelm.) Small. Region of Cartago, growing on *Polygonum punctatum*. Extending to the United States. Flowers 2 mm. long, in dense cymes; corolla lobes obtuse; capsule indehiscent.

Cuscuta odontolepis Engelm. var. **fimbriata** Yuncker. Collected by Warscewicz, without indication of the locality. Also in Mexico. Flowers 3–5 mm. long, in dense cymes; corolla lobes acute; capsule circumscissile.

DICHONDRA Forst.

Slender, small, repent herbs, glabrous or sericeous; leaves reniform or cordate-orbicular, entire; flowers small, pedicellate, solitary in the leaf axils; sepals distinct, subequal, usually spatulate; corolla broadly campanulate, deeply 5-lobate; stamens shorter than the corolla; ovary bilobate, each lobe 2-celled and 2-ovulate; styles 2 between the lobes, filiform, the stigmas capitate; fruit of 2 capsules, these usually 1-seeded.—A single species grows in Central America.

Dichondra repens Forst. var. **sericea** (Sw.) Choisy. Common in grassy places of the Meseta Central, 1,100–1,500 meters; region of San Ramón. A species of wide distribution. A perennial herb, very slender, prostrate and rooting at the nodes, sericeous; leaves reniform, 1–2 cm. wide, the petioles elongate; flowers minute, axillary, solitary; corolla 5-parted; fruit of 2 small, 1–2-seeded capsules.

EVOLVULUS L.

Reference: Van Ooststroom, A monograph of the genus *Evolvulus*. 1934.

Small herbs, erect or procumbent, annual or perennial, pubescent; leaves small, entire; flowers small, generally axillary or solitary and racemose; corolla funnelform or almost rotate, the limb 5-angulate or 5-lobate; stamens included or exserted; capsule 2-celled, the 1–4 seeds glabrous.

Evolvulus alsinoides L. Common in pastures and savannas, Meseta Central to the Pacific coast; region of San Ramón; Guanacaste. A species of wide distribution. Plants slender, perennial, pubescent, branched, procumbent; leaves almost sessile, oblong or elliptic, obtuse, rounded at the base; peduncles axillary, usually longer than the leaves, with 1 or more flowers; corolla blue, 5.5–7 mm. wide.

Evolvulus filipes Mart. Pastures and savannas of the Pacific coast. A species of wide distribution in tropical America. Plants slender, erect or ascending, with few or numerous branches, pubescent; leaves almost sessile, linear or narrowly lanceolate, acute or obtuse, acute at the base; peduncles commonly longer than the leaves, 1–2-flowered; corolla blue or white, 3–4.5 mm. wide. This plant has been referred by many authors to *E. linifolius* L., an African species.

Evolvulus nummularius L. Pastures and other grassy places of the Pacific coast. Widely distributed in tropical America. A slender, prostrate plant, rooting at the nodes, perennial; leaves small, elliptic or rounded, somewhat cordate or truncate at the base, rounded or emarginate at the apex, glabrous or pubescent beneath; flowers sessile, white.

Evolvulus sericeus Swartz. Pastures and savannas of Guanacaste. A species of wide distribution. Plants erect or ascending, sericeous-pubescent, branched; leaves linear, almost sessile, acute at the apex and base; flowers axillary, almost or quite sessile; corolla white or pale blue, 7–12 mm. wide.

Evolvulus tenuis Mart. Río Liberia northeast of Liberia, Guanacaste, 100 meters, *C. W. Dodge 6242*. In its various varieties and forms the species ranges from Yucatan to Paraguay. Plants slender, erect, usually 50 cm. high or less, branched; stems and leaves variously pubescent, in the Costa Rican material sparsely sericeous; leaves subsessile, broadly ovate to lanceolate or oblong, acute or obtuse; peduncles filiform, usually much longer than the subtending leaves, 1–few-flowered; sepals 2.5–3 mm. long; corolla blue or white, 10 mm. wide.

IPOMOEA L. Morning-glory

Herbs or shrubs, generally scandent or prostrate; leaves mostly cordate in the Costa Rican species and entire or lobate; flowers large or small, axillary, solitary or cymose; sepals herbaceous or coriaceous,

equal or somewhat unequal; corolla usually funnelform; stamens included; ovary typically 2–4-celled and 4-ovulate; stigma capitate, entire; fruit capsular.—Many other species grow in Central America. The arborescent species, with white bark and flowers, which are so characteristic of the Pacific coast in certain regions of northern Central America, extend only to Nicaragua. The name Churristate is given commonly in Costa Rica to all species of this genus and its relatives. In other parts of Central America most usual name is Campanilla. In the banana-growing regions one often hears the name Gloria de la mañana given to the plants, a literal translation of the name employed by the North Americans. Pittier reports the Brunka name of Sebé-srut for an undetermined species of *Ipomoea*.

Ipomoea Amparoana Pilger, Repert. Sp. Nov. 17: 125. 1921. Type cultivated in the garden of Doña Amparo de Zeledón, San José. Leaves broad, ovate, shallowly cordate at the base, glabrous above, sericeous-pubescent beneath; cymes with few or numerous flowers, the peduncle 3–4 cm. long; sepals coriaceous, rounded at the apex, 7–8 mm. long, pubescent; corolla pink, the tube 5 cm. long, the limb 8 cm. wide. Related (fide Pilger) to *I. Morelii* Duchass. & Walp.

Ipomoea Batatas (L.) Lam. *Camote*. Common in waste ground, Meseta Central to the Atlantic coast; Cocos Island. Common in cultivation. Native of tropical America, but now distributed throughout tropical and subtropical regions of the earth. Plants prostrate, almost glabrous; leaves cordate, angulate or lobate; peduncles with few or numerous flowers; sepals coriaceous, glabrous, obtuse to acuminate; corolla 5 cm. long, pink or white; capsule 2-celled. It is said that capsules of this species are extremely rare. The sweet potato has long been propagated by its large, edible, tuberous roots. It has every appearance of being adventive in Central America, although it probably has been cultivated there for many centuries. Pittier reports as Indian names: Arabá (Bribrí); Deki (Térraba).

Ipomoea carnea Jacq. Region of San Ramón, at 800–900 meters. Yucatan to West Indies and Venezuela. A large, scandent shrub, the stems velutinous-puberulent, at least when young; leaves long-petiolate, broadly ovate to suborbicular, 5–15 cm. long, obtuse to acuminate, cordate to truncate at the base, puberulent on both surfaces; peduncles stout, equaling or shorter than the petioles, several-flowered; sepals suborbicular, 5–9 mm. long, puberulent;

corolla violet-pink or sometimes white, 6–7 cm. long, sericeous outside; capsule ovoid, 1.5 cm. long; seeds long-lanate.

Ipomoea cathartica Poir. *Churristate.* Common in thickets of the tierra caliente. A species of wide distribution. An almost glabrous vine; leaves cordate, entire or trilobate; sepals herbaceous, attenuate, 15–20 mm. long, usually glabrous; corolla purple or pink, about 8 cm. long. A handsome and showy plant because of its large flowers. Among all the flowers of the Atlantic tierra caliente of Central America, there are few so beautiful and abundant as the Ipomoeas, which in early morning spread mantles of elegant color over trees and shrubs of the coastal regions. They are often especially profuse in growth on the thickets bordering lowland streams.

Ipomoea costaricensis Kuntze, Rev. Gen. 443. 1891. Baguar and Angostura, *Kuntze.* A vine, the leaves cordate, pilose, entire; flowers corymbose, "red-brown," the peduncles much longer than the leaves; sepals broad, obtuse, ovate, herbaceous, puberulent; corolla large; ovary 2-celled; seeds covered with long hairs. An imperfectly known species.

Ipomoea crassicaulis (Benth.) Robinson. North of Piedades de Santa Ana, 940 meters, *Solís 137;* also cultivated in the garden of Doña Amparo de Zeledón, San José, *Brenes & J. Valerio 81.* Mexico to South America. Plants erect, 1–2 meters high, more or less woody; leaves long-petiolate, lance-cordate to ovate-cordate, 10–25 cm. long, long-acuminate, minutely puberulent or glabrous; corolla pink or purple, 5–8 cm. long; sepals about 7 mm. long, rounded at the apex, coriaceous, very minutely puberulent; seeds black-hairy.

Ipomoea digitata L. Reported from swamps of the Atlantic coast. A species of wide distribution. A vine, the leaves deeply lobate, the 3–7 lobes entire; sepals rounded, obtuse, coriaceous, 8–10 mm. long, glabrous; corolla lilac, 4–6 cm. long; seeds pilose.

Ipomoea gracilis R. Br. Reported for Costa Rica, probably from Nicoya. A species of wide distribution. A glabrous vine; leaves cordate, sometimes more or less hastate; peduncles 1–5-flowered; sepals ovate, the inner ones rounded and mucronate at the apex, the outer acuminate, 6–8 mm. long; corolla rose-purple, 4–5 cm. long.

Ipomoea hirsutula Jacq. *Churristate. I. affinis* Mart. & Gal.; *I. mexicana* Gray. Common in thickets, Meseta Central to the

Pacific coast. Widely distributed in tropical America. A densely pilose vine, the leaves trilobate; peduncles with 1 or few flowers; sepals herbaceous, attenuate, covered with long, stiff hairs, 8–15 mm. long, narrow; corolla rose-purple, 2.5–3 cm. long; ovary 3-celled.

Ipomoea iostemma House, Ann. N. Y. Acad. Sci. 18: 207. 1908. Nicoya, *Tonduz 13680*. Guanacaste. Also in Mexico. A vine, the leaves cordate, entire or somewhat hastate-trilobate, more or less pubescent; peduncles shorter than the petioles, mostly 1-flowered; sepals linear, herbaceous, 10–12 mm. long, glabrous; corolla purple, 2–3 cm. long; ovary 2-celled; seeds glabrous.

Ipomoea Learii Paxton. Cocos Island. Probably a native of the Old World but frequent in cultivation. A pubescent vine, the leaves lobate or angulate; peduncles with 3–9 sessile flowers; sepals herbaceous, linear-lanceolate, 2 cm. long; corolla blue, 5–6 cm. long. It is probable that this is the species seen so often in gardens of the temperate region, where it is conspicuous for its large, bright blue flowers.

Ipomoea Meyeri (Spreng.) G. Don. Thickets of the Pacific coast; region of San Ramón, at 700 meters or less. Widely distributed in tropical America. A slender vine, glabrous or somewhat pilose; leaves cordate, entire or lobate; peduncles short or elongate, 1–10-flowered; sepals herbaceous, linear-lanceolate, pilose, 2–3 cm. long; corolla purple, 2.5–3 cm. long; seeds pubescent.

Ipomoea minutiflora (Mart. & Gal.) House. Grassy places near Nicoya. Mexico and Brazil. Plants small, prostrate or ascending, very delicate; leaves small, rounded-cordate, entire, pubescent above, glabrous beneath; peduncle filiform, 1–3-flowered; sepals only 2 mm. long; corolla yellow, 1–1.5 cm. long. Easy of recognition because of the very small, yellow flowers.

Ipomoea Morelii Duchass. & Walp. Thickets of the tierra caliente; also about San José. Mexico to Colombia. An almost glabrous vine, the leaves narrowly ovate-cordate or almost oblong, entire or somewhat hastate-lobate; peduncles 1–5-flowered; sepals coriaceous, obtuse, glabrous, 5–8 mm. long; corolla pink, 5–6 cm. long.

Ipomoea muricata Cav. Near Escasú, *Solís 303*. Arizona and New Mexico to Colombia. A slender, erect perennial, 30 cm. high or less, from a tuberous root, simple or branched, puberulent or almost glabrous; leaves pedately parted into numerous linear or filiform

segments less than 1.5 cm. long; corolla about 2.5 cm. long, bright pink. Easily recognized by the tuberous roots, erect habit, and narrow segments of the parted leaves; in appearance most unlike other Central American species of the genus.

Ipomoea mutabilis Lindl. San Vicente, 1,300 meters. Mexico to Brazil. A vine, the leaves broad, somewhat cordate at the base, trilobate, sparsely sericeous beneath; sepals herbaceous, linear-lanceolate, 10–15 mm. long; corolla purple, 7–8 cm. long.

Ipomoea nicoyana House, Ann. N. Y. Acad. Sci. 18: 231. 1908. Forests near Nicoya, *Tonduz 13671*. Forests of Guanacaste, and elsewhere in the Pacific tierra caliente; region of San Ramón; at 900 meters or less. Panama. A herbaceous vine, the leaves large, shallowly cordate at the base, entire, somewhat pubescent beneath; peduncles shorter than the petioles, few-flowered; sepals coriaceous, lanceolate, acute, pubescent or glabrous; corolla blackish purple, 8–6 cm. long; capsule ovoid, rostrate, the seeds covered with long hairs. The species is well marked by the very unusual color of its corollas. Probably it is synonymous with *I. costaricensis*.

Ipomoea Nil (L.) Roth. In thickets, Meseta Central to the Pacific coast; region of San Ramón. Almost pantropic in distribution. A more or less hirsute vine, the leaves lobate; sepals herbaceous, linear, narrow-attenuate, 2–3 cm. long, hispid; corolla purple, 4.5–6 cm. long.

Ipomoea parasitica (HBK.) G. Don. *Pudreoreja*. Common in thickets, Meseta Central to the coasts; region of San Ramón. Widely distributed in tropical America. An almost glabrous vine; leaves large and broad, cordate, entire; petioles very long, the peduncles shorter, 5–9-flowered; sepals coriaceous, broad, 4–5 mm. long, the inner ones rounded at the apex, the outer ones acutish; corolla purple, 3 cm. long, pubescent outside in bud.

Ipomoea Pes-caprae (L.) Roth. *Pudreoreja de playa*. A characteristic plant of sea beaches of both coasts; Cocos Island. Pantropic. Plants prostrate upon the sand, the tough, stout stems as much as 10 meters long, glabrous; leaves rounded or oval, thick and succulent, rounded at the base, often emarginate at the apex; sepals rounded, glabrous; corolla purple, 4–5 cm. long. The specific name signifies "goat-foot," an allusion to the shape of the leaves.

Ipomoea phillomega (Vell.) House. *Churristate*. *I. syringifolia* Meisn. Thickets of the tierra caliente. Widely distributed in

tropical America. An almost glabrous vine, the leaves broad, shallowly cordate at the base, entire; peduncles usually long and many-flowered; sepals coriaceous, rounded, glabrous, 5–6 mm. long; corolla pinkish purple or pink, 3–3.5 cm. long. A handsome plant because of its beautifully colored flowers.

Ipomoea purga (Wender.) Hayne. *Mechoacán, Churristate.* Common in thickets and hedges, Meseta Central to the coasts, ascending to 1,800 meters; region of San Ramón. Mexico and Central America. A glabrous vine, the leaves cordate, entire, the upper ones almost sessile; peduncles short and commonly 1-flowered; sepals coriaceous, glabrous, broad, obtuse and mucronate; corolla purple-red, 5–8 cm. long or larger. A showy plant, with large flowers of a brilliant shade of purple-red. The fusiform root, sometimes of considerable mass and weight, is one of the favorite purgatives in domestic medicine. The species has been reported from Costa Rica under the name *I. Jalapa.*

Ipomoea purpurea (L.) Lam. Cultivated for ornament in San José, and perhaps existing also in a wild state. Widely distributed in tropical and subtropical America. Stems slender, herbaceous, twining, retrorsely pilose; leaves long-petiolate, broadly ovate-cordate, acute or acuminate, sparsely pilose; peduncles usually longer than the petioles, 1–5-flowered; sepals herbaceous, lanceolate or oblong-lanceolate, acute, 10–16 mm. long, pilose near the base; corolla purple, blue, or white, 5–6 cm. long; ovary usually 3-celled; seeds glabrous.

Ipomoea Purpusi House. Reported from the region of El General, determined by C. V. Morton. Southern Mexico. Plants large and scandent, the stems densely pilose; leaves broadly ovate, deeply 3-lobate, the lobes acuminate, densely appressed-pilose above, more densely pilose beneath; peduncles elongate, 1–5-flowered; sepals oblong-lanceolate, acute, apiculate, the inner ones 8–10 mm. long, ciliate near the apex, otherwise glabrous, the outer ones shorter, pubescent and ciliate; corolla 3 cm. long.

Ipomoea reptans (L.) Poir. Banks of streams and margins of marshes, Atlantic coast. Pantropic. Plants aquatic, the stout, succulent stems rooting at the nodes; leaves sagittate or hastate, the segments narrow and entire; sepals coriaceous, obtuse; corolla white or pinkish, 4 cm. long.

Ipomoea squamosa Choisy. Pacific slope; region of San Ramón; Guanacaste; thickets of the regions of Cartago and Santa

María de Dota, 1,200–1,600 meters. Nicaragua to Brazil. An almost glabrous vine; leaves ovate-cordate, entire; peduncles shorter than the petioles, with 1 or few flowers; sepals somewhat coriaceous, obtuse, glabrous, about 12 mm. long; corolla 4.5–8 cm. long, white, greenish white, or pale yellowish.

Ipomoea stolonifera (Cyrill.) Poir. Beaches of the Atlantic coast. Almost pantropic. Plants prostrate, rooting at the nodes; glabrous; leaves small, oblong, emarginate at the apex and base, thick; sepals somewhat coriaceous, 3–5 mm. long. A characteristic plant of the beaches, much smaller in all its parts than *I. Pes-caprae*, and much less common.

Ipomoea tiliacea (Willd.) Choisy. *Pudreoreja, Churristate.* Common in thickets, Meseta Central to the Atlantic coast, ascending to 1,800 meters; region of San Ramón. Widely distributed in tropical America. A glabrous or somewhat pubescent vine; leaves cordate, entire; sepals broad, coriaceous, glabrous, mucronate; corolla purple or pink, 5–6 cm. long.

Ipomoea tricolor Cav. *Pudreoreja, Churristate.* Common in thickets and hedges of the Meseta Central and upper Pacific slope; region of San Ramón. Widely distributed in tropical America. An almost glabrous vine, the leaves broad, cordate; peduncles hollow, thick, longer than the petioles, the pedicels elongate; sepals narrow, 5–6 mm. long, pale-marginate; corolla purple, 5–6 cm. long.

Ipomoea trifida (HBK.) Don. Thickets of the Pacific tierra caliente; region of San Ramón; at 1,050 meters or less. Southern United States to South America. A sparsely pubescent or almost glabrous, herbaceous vine; leaves long-petiolate, broadly ovate-cordate and usually more or less trilobate, acuminate; peduncles longer than the petioles, bearing few or rather numerous, crowded flowers; sepals coriaceous, unequal, glabrous, about 1 cm. long, acuminate and mucronate; corolla rose-purple or violet-purple, about 3 cm. long.

Ipomoea triloba L. *Churristate.* Common in thickets of the Meseta Central, extending to the Pacific coast; region of San Ramón. Widely distributed in tropical America. A slender vine, somewhat pubescent; leaves trilobate, the lobes acuminate; peduncles elongate, few-flowered; sepals coriaceous, acuminate, pubescent or at least ciliate; corolla pink or purple, 2–3 cm. long.

Ipomoea Tweediei Hook. Vicinity of San José. Extending to Paraguay. A slender, glabrous vine; leaves cordate, acuminate,

entire, the petioles of the upper leaves short; peduncles 1–2-flowered; sepals unequal, ovate, coriaceous, obtuse or acute, the margins pale; corolla blue or purple, about 2.5 cm. long.

Ipomoea umbraticola House, Ann. N. Y. Acad. Sci. 18: 259. 1908. Nicoya, *Tonduz 13677*. Endemic. A vine, the leaves cordate, entire or trilobate, pubescent on the upper surface, almost glabrous beneath; peduncles longer than the leaves, many-flowered; sepals coriaceous, rounded, 5 mm. long, glabrous, corolla 4 cm. long; capsule 2-celled, the seeds glabrous.

JACQUEMONTIA Choisy

Herbaceous vines, the leaves mostly cordate, entire; flowers small or medium-sized, in cymes or heads; corolla campanulate or rotate-campanulate, the limb 5-angulate; stamens shorter than the corolla; ovules usually 4; stigmas 2, compressed; capsule 2-celled. —Other species occur in Central America and probably also in Costa Rica.

Jacquemontia azurea (Desr.) Choisy. Carrillos de Poás, collected only by Brenes. Southern Mexico to South America. Plants slender, herbaceous, sordid-glandular-pilose almost throughout, but especially in the inflorescence; leaves ovate-oblong to rounded-ovate, 1–4 cm. long, usually long-acuminate, pilose; cymes with 3–several flowers, dense, the pedicels very short; sepals long-acuminate, pubescent; corolla blue, 1 cm. long.

Jacquemontia ciliata Sandwith. Las Vueltas, Tucurrique, 635 meters. Also in Panama and Trinidad. Leaves ovate-cordate, pilose, acuminate; flowers numerous, in dense, pedunculate cymes; corolla blue, 12–18 mm. long, glabrous outside; sepals 4–5 mm. long, rounded at the apex, ciliate.

Jacquemontia menispermoides Choisy. Reported from the region of El General, determined by C. V. Morton. Extending to Brazil. Leaves broadly ovate to oblong-ovate, 3.5–6 cm. long, obtuse and mucronulate, shallowly cordate at the base, pilose above, rather densely stellate-tomentose beneath; peduncles elongate, rather dense and many-flowered, the flowers short-pedicellate; sepals 6 mm. long, broadly rounded or almost truncate and muticous at the apex, glabrous, ciliolate; corolla 2 cm. long, blue.

Jacquemontia nodiflora (Desr.) Don. El Rodeo, *Lankester 1309;* region of San Ramón, at 700–800 meters. A species of wide distribution. Plants sometimes suffrutescent, tomentose; leaves

ovate-cordate; cymes dense and many-flowered, almost sessile; corolla white, 12 mm. long, glabrous outside; sepals rounded at the apex, glabrous.

Jacquemontia pentantha (Jacq.) Don. *J. violacea* Choisy. Reported from the Pacific tierra caliente. Widely distributed in tropical America. Similar to *J. ciliata*, but the sepals acute and not ciliate; corolla blue.

Jacquemontia Perryana Duchass. & Walp. Buenos Aires, 480 meters, *M. Valerio 926*. Mexico to South America. Flowers white, in large heads subtended by broad bracts; corolla 3.5 cm. long, densely pilose outside.

MARIPA Aubl.

Woody vines; leaves alternate, coriaceous, not cordate; flowers rather small, in many-flowered cymes, these corymbose or paniculate at the ends of the branches; sepals ovate, obtuse, coriaceous, subequal, persistent; corolla campanulate, the limb plicate, shallowly or deeply 5-lobate; stamens included or exserted, the anthers oblong or linear; ovary 2-celled, 4-ovulate; fruit ovoid, oblong, or globose, fleshy or indurate, indehiscent, usually by abortion 1-seeded.—Two other species are known from Central America, both in Panama.

Maripa nicaraguensis Hemsl. Forests of the tierra caliente. Extending to British Honduras. A large, scandent shrub, almost glabrous; leaves short-petiolate, oblong or oval, entire, short-acuminate, obtuse or rounded at the base; flowers about 1.5 cm. long, pale purple, in dense, terminal or axillary cymes; corolla densely pilose outside; sepals rounded at the apex; fruit large, globose.

MERREMIA Dennstedt

Scandent herbs, the leaves entire and cordate or palmate-parted or palmately compound; flowers small or large, axillary, solitary or cymose; sepals usually unequal; corolla campanulate or funnelform, white or yellow, glabrous; stamens and style included; ovary 2–4-celled, 4-ovulate; capsule dehiscent by valves, the seeds 4 or fewer.—A few other species grow in Central America.

Merremia aegyptia (L.) Urban. *M. pentaphylla* Hallier; *Ipomoea aegyptia* L. Thickets of the Pacific coast. A species of wide distribution. A large vine, hirsute throughout with long, stiff hairs; leaves compound, the 5 leaflets elliptic, acuminate, entire; flowers in pedunculate cymes; corolla white, 2.5–3.5 cm. long.

Merremia cissoides (Vahl) Hallier. *Ipomoea cissoides* Griseb. Thickets of the Pacific coast; region of San Ramón. A species of wide distribution. A small vine, covered in all parts with stipitate glands and a few long, stiff, spreading hairs; leaves compound, the 5 leaflets oblong or lanceolate, dentate; peduncles with 1 or few flowers; sepals glandular and pilose, acuminate; corolla white, 2.5 cm. long.

Merremia quinquefolia (L.) Hallier. *Ipomoea quinquefolia* L. Thickets of the Pacific tierra caliente. A species of wide distribution. Similar to the last preceding species; sepals obtuse, glabrous; corolla white, 2–2.5 cm. long.

Merremia umbellata (L.) Hallier. *Churristate. Ipomoea umbellata* Mey.; *I. polyanthes* Roem. & Schult. Common in thickets, Meseta Central to the coasts. A species of wide distribution. A glabrous or somewhat pubescent vine; leaves cordate, sometimes almost orbicular, acuminate, entire; cymes umbelliform, many-flowered; sepals obtuse, glabrous; corolla yellow, 2.5–3.5 cm. long; seeds pubescent. A species easy of recognition in its group because of its showy, bright yellow flowers.

OPERCULINA Manso

Scandent herbs, glabrous or nearly so; leaves cordate, entire or lobate; flowers large, axillary, solitary or cymose; sepals large, scarious, glabrous, in fruit accrescent and somewhat coriaceous; corolla campanulate or funnelform, pink or yellow; style 1, the stigma biglobulose; capsule large, circumscissile, with 1–4 glabrous seeds.—Other species are known from Central America.

Operculina alatipes (Hook.) House. *Mechoacán.* Thickets of the Pacific tierra caliente. Mexico to Colombia. A glabrous herb; leaves lanceolate or ovate-cordate, acuminate; peduncles conspicuously winged; sepals 2.5 cm. long; corolla pink or purple, the tube 4–5 cm. long.

Operculina tuberosa (L.) Meisn. Common in thickets and forests of the Atlantic tierra caliente. A species of wide distribution. A large vine; leaves deeply 7-lobate, the lobes acuminate, almost glabrous; peduncles not winged; sepals large, in fruit as much as 6 cm. long; corolla bright yellow, 5 cm. long; capsule very large. A highly ornamental plant because of its large, showy flowers. It is often planted for ornament.

QUAMOCLIT Moench

Twining herbs, annual or perennial; leaves entire, lobate, or pinnately parted; flowers medium-sized or large, showy, solitary or in cymes or racemes; corolla with a slender tube and a rotate, 5-angulate limb; stamens and style exserted, the stigma capitate; ovary 2-celled, 2-ovulate; fruit capsular.—It is probable that there are no other Central American species.

Quamoclit coccinea (L.) Moench. *Cundeamor. Ipomoea coccinea* L. Thickets of the Meseta Central, 1,100–1,400 meters, and probably in other regions; region of San Ramón. A species of wide distribution. Leaves glabrous, cordate, sometimes somewhat angulate, narrow-acuminate; peduncles few-flowered; corolla scarlet, 2–4 cm. long. An ornamental plant, often cultivated in gardens of Europe and North America.

Quamoclit pennata (Desr.) Bojer. *Cundeamor.* Occasional in thickets, Meseta Central to the coasts. A species of wide distribution. Leaves small, pinnately parted, the segments linear, numerous; peduncles 1–6-flowered; corolla scarlet, rarely white, 2.5–3.5 cm. long. Often cultivated as an ornamental plant.

Quamoclit vitifolia (Cav.) Don. In thickets, region of the Meseta Central to the Pacific coast, ascending to 1,800 meters; region of San Ramón. Central America and Mexico. A large vine; leaves deeply 3-lobate, almost glabrous; flowers bronze-yellow, 1.5–2 cm. long, the cymes many-flowered, the peduncles elongate.

RIVEA Choisy

More or less woody vines, sometimes wholly herbaceous; leaves cordate; flowers large or medium-sized, in pedunculate, axillary cymes; sepals ovate to lanceolate, spreading and little enlarged in fruit; corolla campanulate or funnelform; ovary 2-celled or 4-celled, the stigmas 2; fruit dry, somewhat ligneous, indehiscent, 1-celled and usually 1-seeded; seeds glabrous.—A single species is known from Central America.

Rivea corymbosa (L.) Hallier. *Turbina corymbosa* Raf. Thickets of the Pacific coast. A species of wide distribution. Plants scandent, often somewhat woody; leaves cordate, entire, glabrous or pubescent; peduncles with few or numerous flowers; sepals scarious, 1 cm. long; corolla white, campanulate, 2–3 cm. long; stamens included.

STICTOCARDIA Hallier

Woody vines, the leaves commonly large and broad, long-petiolate; flowers large and showy, axillary; sepals becoming greatly enlarged and enclosing the fruit; corolla funnelform or campanulate; ovary 4-celled, the cells 1-ovulate; style 1, the stigma globose; fruit baccate, indehiscent.—A single species is found in Central America.

Stictocardia campanulata (L.) Standl. *Rivea campanulata* House. Playa Blanca, Golfo Dulce, *M. Valerio 445;* Los Loros, *Brenes 22047*. A species of wide distribution. A herbaceous or somewhat woody vine, almost glabrous; leaves large, broadly cordate, acute, entire, the petioles elongate; flowers cymose, the cymes long-pedunculate; sepals large, obtuse; corolla pink, funnelform, 7–8 cm. long; stigmas 2, linear; fruit 2–2.5 cm. broad, enclosed in the accrescent sepals.

POLEMONIACEAE. Phlox Family

Herbs or rarely shrubs, sometimes scandent; leaves alternate or opposite, entire or dentate or variously parted; flowers perfect, regular or rarely bilabiate, usually terminal, solitary, paniculate, capitate, or corymbose; sepals 5, more or less connate; corolla gamopetalous; stamens 5, inserted on the corolla, free, included or exserted, the filaments filiform, glabrous or barbate at the base, the anthers ovoid; ovary superior, inserted on a more or less distinct disk, usually 3-celled, sessile, the ovules 1 to many in each cell; style filiform, the usually 3 stigmas short-linear; fruit capsular, usually loculicidally dehiscent.—No other genera are known from Central America.

COBAEA Cav.

Reference: Standley, Contr. U. S. Nat. Herb. 17: 448. 1914.

Scandent herbs; leaves alternate, sessile, pinnate, with a multifid, terminal tendril, the leaflets usually 3 pairs; flowers axillary, solitary or geminate, long-pedunculate; calyx cleft nearly to the base; corolla campanulate or funnelform-campanulate, longer than the calyx; filaments barbate at the base, exserted; capsule coriaceous, septicidally dehiscent; seeds large, compressed, broadly winged.—A few other species are found in Central America.

Cobaea Aschersoniana Brand, Helios 21: 87. *f. 2*. 1904. *Rosenbergia Aschersoniana* House, Muhlenbergia 4: 25. 1908. Forests of La Esmeralda, Volcán de Barba, 2,000 meters, *Biolley 7178*. Region of Dota and on the slopes of Volcán de Turrialba, at 1,600–2,500 meters. Endemic(?); perhaps also in Panama. Stems pilose; leaf-

lets elliptic or oblong, 3–8 cm. long, acuminate, glabrous above, hirsute beneath on the nerves; peduncles densely villous, 14–20 cm. long; calyx segments densely villous, linear-lanceolate, 3–3.5 cm. long; corolla greenish yellow, twice as long as the calyx, the lobes broadly ovate at the base, abruptly contracted into a long-linear tip; capsule elliptic, 5 cm. long, the seeds 2–2.5 cm. long. Illustrated by Brand, Pflanzenreich IV. 250: *f. 7, A.*

Cobaea gracilis (Oerst.) Hemsl. Garden 17: 352. 1880. *Rosenbergia gracilis* Oerst. Vid. Medd. Kjoebenhavn 31. 1856. Naranjo, *Oersted.* Regions of Dota and San Ramón, at 1,200–2,500 meters; reported also from the region of Cartago. Panama. Stems glabrous; leaflets elliptic or oblong, 3–9 cm. long, acuminate; peduncles 15–27 cm. long, glabrous; calyx lobes 2 cm. long, glabrous; corolla yellow, the tube 2 cm. long, the lobes 3–4 cm. long, narrowly long-attenuate from the base. Illustrated, Oersted, L'Amérique Centrale *pl. 15;* Contr. U. S. Nat. Herb. 17: *pl. 28.*

Cobaea lutea Don (*C. macrostema* Pavón) has been reported from Costa Rica (see Brand, Pflanzenreich IV. 250: 26. 1907), but it is probable that the report is erroneous.

Cobaea minor Mart. & Gal. Slopes of Turrialba and Irazú, at about 2,400 meters. Southern Mexico. Stems slender, glabrous; leaflets elliptic, 1.5–4 cm. long, short-acuminate, mucronulate; peduncles slightly shorter than the leaves; calyx lobes ovate-lanceolate, acute; corolla pink, twice as long as the calyx, the lobes short, broadly ovate, obtuse or rounded at the apex. I have seen the plant in flower but once, on the lower slopes of Irazú and Turrialba, where the large, bell-shaped flowers, delicately colored with pale pink, were a most beautiful sight, dangling from the branches over which the vines were draped.

Cobaea scandens Cav. *Campanula.* Cultivated occasionally for ornament in the temperate regions. Perhaps native in Mexico. A large, glabrous vine; leaflets ovate or elliptic, 9–11 cm. long, glabrous; calyx segments rounded-ovate, united for half their length, green, rounded and apiculate at the apex; corolla twice as long as the calyx, green and brown-purple. The vine is grown occasionally for ornament also in the United States, and it has long been known in cultivation in Europe. The large flowers are not especially conspicuous, and because of their unusual coloring are bizarre rather than beautiful.

LOESELIA L.

Annual or perennial herbs or low shrubs; leaves mostly alternate, usually dentate; flowers solitary, geminate, or capitate in the leaf axils and often subtended by numerous imbricate bracts; calyx tubular or campanulate; corolla bilabiate; stamens glabrous, the filaments exserted; capsule ovoid or oblong, with 3 to many seeds.—No other species are known from Central America.

Loeselia ciliata L. Thickets of the Pacific coast; Guanacaste. Panama to Mexico. A slender annual, 60 cm. high or less, with pale stems; leaves petiolate, ovate, acutely dentate; bracts of the inflorescence very numerous and conspicuous, rounded-cordate, sessile, the teeth ending in long bristles; corolla pale yellow, about 1 cm. long.

Loeselia glandulosa (Cav.) G. Don. Common at middle elevations in the central region, at 1,000–1,800 meters, in hedges, thickets, and pastures, or on open, dry slopes. Arizona to Colombia. An erect annual with brittle stems, usually 30–60 cm. high, much branched, glandular-pubescent, especially in the inflorescence; leaves short-petiolate, lanceolate or ovate, serrate, cuneate at the base; flowers densely glomerate, the bracts linear-lanceolate, the outer ones green; corolla purple, 1–1.5 cm. long. An unattractive and rather weedy plant, common in many localities about San José and Cartago.

HYDROPHYLLACEAE. Waterleaf Family

Reference: Brand, Pflanzenreich IV. 251. 1913.

Annual or perennial herbs, rarely shrubs or small trees; leaves alternate or opposite, simple or variously parted; flowers perfect, regular, terminal and axillary, the branches of the inflorescence usually more or less scorpioid; sepals normally 5, short-connate, persistent and often accrescent in fruit; corolla gamopetalous, usually 5-lobate, cylindric to funnelform, campanulate, or rotate; stamens usually 5, inserted on the corolla, included or exserted, the filaments glabrous or barbate, filiform, the anthers oblong, ovoid, or sagittate; ovary superior, usually 1-celled, sessile, with 2 usually parietal placentae, the ovules 2 to many; styles 1 or 2, filiform, the 2 stigmas capitate or rarely subulate; fruit capsular, usually loculicidal and bivalvate.—The genus *Nama* is represented in Central America by two species, one of which may be expected in the tierra caliente of Costa Rica.

HYDROLEA L.

Annual or perennial herbs of wet soil, often armed with spines; leaves alternate, entire; inflorescence usually corymbose; calyx parted almost to the base; corolla campanulate-rotate, deeply parted, blue; filaments dilated at the base, glabrous, naked; styles usually 2; ovules very numerous; capsule ovoid or globose; seeds minute, longitudinally rugose-striate.—A single species is known from Central America.

Hydrolea spinosa L. Wet places of the tierra caliente, apparently not common. Widely distributed in tropical America. A stout, erect herb, usually 50 cm. or less in height, branched, densely viscid-pilose, armed with numerous stiff, slender spines; leaves sessile or short-petiolate, lanceolate to oblong or elliptic, 3–12 cm. long, acute, narrowed to the base, entire; flowers short-pedunculate, bright blue, scattered or congested at the ends of the branches; sepals oblong, acute, 5–7 mm. long, glandular-pilose; corolla 10–12 mm. broad; stamens equaling or slightly longer than the corolla; capsule irregularly dehiscent.

WIGANDIA HBK.

Shrubs or small trees, densely hairy; leaves very large, petiolate, more or less dentate; flowers large and showy, purple or purplish, forming large panicles; calyx parted to the base; corolla funnelform-campanulate or short-salverform; stamens short-exserted, the filaments usually barbate, naked, the anthers sagittate; styles 2, elongate; ovules very numerous; calyx loculicidally dehiscent; seeds minute, brown, winged.—Only one or two species are found in Central America.

Wigandia caracasana HBK. *Ortiga de montaña, Ortiga.* Frequent in hedges or thickets of the Meseta Central; region of Dota; mostly at 1,100–1,600 meters. Mexico to Venezuela. A large shrub or small tree, seldom more than 3 meters high, branched, densely covered with stiff or soft, usually whitish hairs; leaves ovate or oval, often 50 cm. long and 35 cm. wide, or even larger, irregularly and doubly crenate, whitish-tomentose beneath; sepals 10–15 mm. long; corolla purple, about 3 cm. broad. The plant is a striking and rather handsome one. The stiff hairs penetrate the skin easily, and sting the flesh almost like a nettle. Some of the Costa Rican specimens might well be referred to *W. Kunthii* Choisy, if one depends upon the characters used by Brand in separating these two species. As

a matter of fact, I suspect that *W. Kunthii* is nothing more than a variety of *W. caracasana*, separable by no constant character. Pittier reports that an infusion of the leaves is a domestic remedy for rheumatism.

BORAGINACEAE. Borage Family

Herbs, shrubs, or trees, rarely scandent, usually with rough, harsh pubescence; stipules none; leaves alternate or rarely opposite, entire or dentate; flowers regular, perfect, normally dichotomous-cymose, with the flowers secund along the branches, but the inflorescence often otherwise, sometimes capitate or spicate; calyx inferior, usually persistent, cylindric or campanulate, normally 5-dentate or 5-lobate; corolla gamopetalous, funnelform, tubular, salverform, campanulate, or subrotate, the limb usually 5-lobate, the lobes imbricate or rarely contorted; stamens as many as the corolla lobes and alternate with them, inserted on the corolla, the filaments filiform, often dilated at the base, the anthers ovoid to linear, dorsifixed; ovary superior, sessile, normally of two 2-ovulate carpels, or the carpels sometimes 4-celled, the cells 1-ovulate, or the ovary distinctly 4-lobate; style short or filiform, entire or one or more times bifid, the stigmas capitate or bilobate; fruit drupaceous and with a hard, 2–4-celled endocarp, or with 2–4 pyrenes, or often of 4 or fewer dry nutlets.

BEURERIA P. Br.

Shrubs or trees; leaves alternate, petiolate, entire; flowers small or rather large, white, in terminal, corymbiform cymes; calyx campanulate, 2–5-lobate, the lobes valvate in bud; corolla salverform, the limb 5-lobate; stamens inserted on the corolla tube; ovary 2-celled or incompletely 4-celled, the styles 2-cleft or connate; fruit drupaceous, with thin flesh, enclosing 4 bony nutlets.—One or two additional species probably are found in Central America.

Beureria cumanensis (Loefl.) O. E. Schulz. Near Lepanto, Guanacaste, *Brenes 15703*. West Indies, Colombia, Venezuela. A tree of 3–6 meters; leaves short-petiolate, ovate to obovate, 3.5–5.5 cm. long, acute to rounded at the apex, subacute or obtuse at the base, glabrous or when young pubescent; inflorescence 10–30-flowered, the branches short-pilose; calyx 7–8 mm. long, glabrous or pubescent; corolla 2–3.5 cm. long, glabrous; drupes 1 cm. long or more, the pyrenes trigonous and cordate, the sides narrowly winged.

Beureria Huanita (Llave & Lex.) Hemsl. *Quisjoche*. La Palma de San Ramón; between Río Paquita and Río Viejo, Province of

San José; reported from Nicoya. Extending to Mexico. A medium-sized tree; leaves petiolate, ovate-oblong to obovate, mostly 10–15 cm. long, acute or abruptly short-acuminate, obtuse or acute at the base and often unequal, glabrous; calyx glabrous or finely pubescent; corolla white, 2 cm. long or more; filaments pilose near the base; fruit large, subglobose or ovoid. At first I believed that the Costa Rican tree represented a distinct species, and this may well be the case. It is, however, necessary to have more ample material for study before this can be decided satisfactorily.

Beureria littoralis Donn. Smith, Bot. Gaz. 25: 150. 1898. *Esquijoche.* Forests of the plains of Salinas, Golfo Dulce, *Pittier 2787, 2814.* Known only from the collections cited. A small tree, the branchlets and inflorescence pubescent; leaves long-petiolate, oblong-ovate to elliptic, acute or obtuse at each end, 7–12 cm. long, 5–6 cm. wide, scaberulous above with broad-based hairs, pubescent beneath; cymes laxly branched; calyx 4 mm. long, pilose outside; corolla tube equaling the calyx, the lobes suborbicular, 8–9 mm. long. I have seen no material of this species. The flowers are reported to be very fragrant.

BORAGO L. Borage

Annual or perennial, erect, hispid herbs, the leaves alternate; flowers in lax, usually bifid racemes, the branches elongate in age, the bracts small or the lower ones foliaceous, the flowers blue, pedicellate; calyx 5-parted, the segments linear; corolla tube short, the limb rotate or short-campanulate; stamens exserted or included, the filaments dilated toward the apex; nutlets 4, erect, muricate or smooth.

Borago officinalis L. *Borraja.* Sometimes planted in gardens. Native of Europe and Asia. A coarse, rough-hispid, perennial herb; leaves oblong to obovate, long-petiolate, entire, obtuse to acuminate; flowers large and showy, in terminal racemes. The plant is employed in domestic medicine for its sudorific and emollient properties.

CORDIA L.

Shrubs or trees, often with harsh pubescence; leaves petiolate, entire or dentate; flowers sessile, or nearly so, disposed in spikes or heads, or in cymes with often scorpioid branches, small or large; calyx tubular or campanulate, smooth or costate, 3–5-dentate, persistent; corolla funnelform, salverform, or campanulate, usually 5-lobate; stamens as many as the corolla lobes, included or exserted;

ovary 4-celled, the style elongate, bifid, the branches again bifid, the stigmas capitate or clavate; fruit drupaceous, the putamen usually osseous, the cells 4 or by abortion fewer.—Other species occur in Central America, and it is probable that some of those not listed here extend into Costa Rica.

Cordia alba (Jacq.) Roem. & Schult. *Tigüilote, Jigüilote.* Common in dry thickets and forest of the Pacific tierra caliente; Guanacaste; ascending to the region of San José. Mexico to West Indies and Venezuela. A large shrub or more often a rounded tree of 9 meters or less; leaves short-petiolate, elliptic to elliptic-ovate or rounded, 5–12 cm. long, subacute to rounded at the apex, more or less dentate or almost entire, very rough on the upper surface, somewhat pilose beneath; panicles often large and many-flowered; calyx campanulate, 4–6 mm. long, 10-costate, hispidulous; corolla white, 10–15 mm. broad; drupes white, 1–1.5 cm. long. The tree is a showy one when covered with the abundant, white blossoms, but for most of the year it is most unattractive in appearance, being gnarled and crooked. In some parts of Guanacaste it is exceedingly abundant, forming extensive thickets, especially by roadsides. It is one of the characteristic small trees through most of the drier parts of the Pacific tierra caliente of Central America. The translucent fruits have a viscid pulp that is intensely sweet. They are much eaten by birds (hence probably the wide dispersal of the trees) and sometimes by people. The wood is brownish, rather light in weight, firm, fibrous, tough, and not durable.

Cordia alliodora (Ruiz & Pavón) Cham. *Laurel, Laurel negro. C. Gerascanthus* Jacq., non L. Common in forests of the tierra caliente; ascending the Pacific slope to the Meseta Central; Guanacaste; region of San Ramón; usually at 1,200 meters or less. Widely distributed in tropical America. A large or medium-sized tree, the pubescence of minute, stellate hairs, abundant on the pale lower leaf surface; leaves short-petiolate, mostly elliptic-oblong, acute or acuminate, entire; flowers small, white, fragrant, in large panicles; calyx tubular, about 5 mm. long, conspicuously 10-costate. The tree is abundant in many regions, especially in the Pacific tierra caliente, and it is well known almost throughout Central America. It is exceptionally showy and conspicuous in flower because of the great abundance of white blossoms. These remain upon the tree for a long time, finally turning brown and making the tree quite as conspicuous as when the corollas were pure white. The crushed foliage has an odor suggestive of garlic, hence the specific name.

The joints of the branchlets nearly always are swollen and inhabited by tiny ants that inflict painful bites. The wood is apparently of two kinds, perhaps dependent upon age of the tree or its habitat: (1) grayish or yellowish, (2) variegated brown, suggesting walnut (*Juglans*). It is easy to work, finishes smoothly, holds its place well when manufactured, and has many uses, as for piling, railway crossties, and furniture. Pittier reports the Bribrí name of Dze-uí. The species is easily recognized by its stellately branched pubescence.

Cordia cymosa (Donn. Smith) Standl., comb. nov. *Cornutia cymosa* Donn. Smith, Bot. Gaz. 40: 10. 1905. Pastures at La Palma, Prov. San José, 1,460 meters, *Tonduz 12555* (*J. D. Smith 7383*). Apparently frequent in the region of San Ramón. Endemic. A tree of 5–8 meters, the branchlets ferruginous-tomentose; leaves petiolate, broadly elliptic or rounded-ovate, 20–28 cm. long, 14–23 cm. wide, very obtuse or rounded at the apex, subacute to subcordate at the base, hispidulous above, very densely and softly villosulous-pilose beneath; inflorescence cymose-paniculate, 20–30 cm. broad, the flowers sessile or subsessile; calyx tubular-campanulate, 3 mm. long, ecostate; corolla white, the tube equaling the calyx; drupes globose, glabrous, 8 mm. in diameter. Easy of recognition because of the unusually large leaves.

Cordia diversifolia Pavón. *C. Johnstoni* Cufodontis, Archivio Bot. 10: 41. 1934 (near Finca Waldeck, 28 miles from Limón, 20 meters, *Cufodontis 365*). Thickets and forest of the Atlantic tierra caliente. Panama to Mexico. A shrub or small tree, rarely more than 5 meters high, the branches hispid; leaves short-petiolate, lanceolate or lance-oblong, mostly 10–20 cm. long, subobtuse to long-acuminate, obtuse or acute at the base, more or less serrate near the apex or entire, rough and short-hirsute on the upper surface, short-hirsute beneath; flowers small, white, cymose-paniculate, the panicles usually small and often few-flowered; calyx conspicuously costate, cylindric, 5–6 mm. long; drupes ovoid, glabrous, 7 mm. long. The type of this species was ascribed originally to Ecuador, but there is no doubt that it is really from the Sessé and Mociño collections, and obtained in Mexico or Guatemala. I have seen three photographs of authentic material, including the type, also specimens from the Sessé and Mociño Herbarium. These are exactly like other material that has been referred in recent years to *C. diversifolia*, and also like *C. Johnstoni*, part of the type of which has been kindly supplied by Dr. Cufodontis. The species is a rather common one along the Atlantic tierra caliente of Central America.

Cordia ferruginea (Lam.) Roem. & Schult. *Varilla negra.* Thickets of the Atlantic tierra caliente; occasional in thickets and hedges of the Meseta Central, at 1,600 meters or less; Cantón de Dota; region of San Ramón. Widely distributed in tropical America. A shrub of 4.5 meters or less, the branches often long and recurved or drooping; leaves short-petiolate, ovate or broadly ovate, acute or acuminate, usually rounded at the base, more or less serrate, very rough on the upper surface, hirsute beneath; flowers small, white, in interrupted, elongate, usually paniculate spikes; calyx not costate, campanulate, 3 mm. long, hispidulous; corolla white, twice as long as the calyx. The shrub is a characteristic species of second-growth thickets.

Cordia Gerascanthus L. Golfo Dulce, *Manuel Valerio 573.* Ranging to southern Mexico and West Indies. A large tree; leaves petiolate, elliptic-oblong, acute or acuminate, acute at the base, entire, glabrous; flowers white, fragrant, in dense, more or less pubescent cymes; calyx tubular, about 1 cm. long, not costate; corolla almost 3 cm. broad.

Cordia glabra L. *Nigüito, Buriogre. C. collococca* L. In thickets and dry forest of the Pacific slope, especially in the tierra caliente; ascending to San José and San Ramón. Extending to Mexico and West Indies. A tree of 5–15 meters; leaves short-petiolate, oblong to obovate or rounded-obovate, very irregular in shape, obtuse to acuminate, acute at the base, entire or nearly so, glabrous or glabrate; flowers small, white, cymose-paniculate, the panicles small or large, usually lax and many-flowered; calyx campanulate, hispidulous, 2–3 mm. long, not costate; fruit cherry-red, 1 cm. in diameter, with very viscid, sweet pulp.

Cordia guanacastensis Standl., sp. nov.—Frutex, ramulis gracilibus nigrescentibus pilis longis patentibus sat dense hispidis; folia parva breviter petiolata crasse membranacea, petiolo 7–10 mm. longo hirsuto; lamina oblongo-lanceolata 6–7.5 cm. longa 2–3 cm. lata acuminata basin versus longiattenuata, remote grosse serrata, supra hispida vel glabrata asperrima, pilis basi verrucoso-dilatatis, subtus glandulosa, pilosa et ad nervos pilis longis patentibus hirsuta; flores arcte sessiles spicati, spicis solitariis longissime pedunculatis clavatis ca. 3 cm. longis et corollis exclusis 1 cm. crassis, pedunculo dense hispido; calyx late campanulatus 3 mm. longus dense hispidulo-strigosus 5-dentatus, dentibus tubo brevioribus triangularibus acutis; corolla alba ca. 7 mm. longa.—Camino de Cañas a Bagaces, cerca

de Las Cañas, Guanacaste, 110 meters, June, 1930, *Brenes 12713* (type in Herb. Field Mus.). Entre Liberia y Guachipelín, *Brenes 15503*.

Cordia littoralis Pittier, Contr. U. S. Nat. Herb. 18: 253. *f. 104*. 1917. On the strand near Limón, *Pittier 3641*. Thickets of the Atlantic tierra caliente. Endemic. A shrub 3.5 meters high or less, the branches densely glandular and sparsely puberulent; leaves petiolate, ovate-lanceolate to broadly ovate, mostly 9–14 cm. long, attenuate to the apex, obtuse or rounded at the base and abruptly decurrent, irregularly and remotely serrate or dentate or entire, scaberulous above, paler beneath and finely pilosulous; flowers small, white, in elongate, interrupted spikes; calyx campanulate, not costate, 3.5 mm. long, 5-dentate, puberulent; corolla tube somewhat longer than the calyx, the lobes short, spreading.

Cordia macrostachya (Jacq.) Roem. & Schult. Thickets of the Atlantic tierra caliente. Extending to southern Mexico and northern South America. A shrub of 1–3 meters; leaves oblong or lanceolate, narrowed to the obtuse or acute apex, acute at the base, dentate or subentire, scabrous on the upper surface, paler beneath and hirsute-tomentose or pilosulous; flowers small, white, in long, usually dense spikes; calyx campanulate, not costate, puberulent.

Cordia nitida Vahl. *Buriogre amarillo, Muñeco, Buriogre de montaña*. Forests of the tierra caliente; region of San Ramón, at 1,200 meters or less. Central America and West Indies. A small or medium-sized tree, the branchlets puberulent; leaves elliptic to oblong, short-petiolate, acute or acuminate, rounded to acute at the base, entire, glabrous, lustrous on the upper surface; flowers small, white, in small or rather large panicles; corolla campanulate, 4 mm. long, not costate, dentate, usually glabrous or nearly so; corolla 1 cm. broad; drupes bright red, 8 mm. in diameter.

Cordia polycephala (Lam.) I. M. Johnston. *Escoba negra, Varilla negra, Cuajatinta. C. corymbosa* Don; *C. ulmifolia* DC. Common in thickets of the tierra caliente, especially of the Pacific slope; region of San Ramón; Guanacaste. Widely dispersed in tropical America. A slender, often densely branched shrub, 3 meters high or less; leaves small, short-petiolate, lance-oblong to ovate-elliptic, acute to long-acuminate, acute to attenuate at the base, coarsely dentate, very rough on the upper surface, softly or harshly pubescent beneath; flowers capitate, the small heads less than 1 cm. in diameter, dense, slender-pedunculate; calyx campanulate, not

costate, 3 mm. long, acutely dentate; corolla white, 5 mm. long; drupes small, red. The shrub is a characteristic species of second-growth thickets. The name *Cuajatinta* is derived from the fact that the plant was used formerly in extracting dye from the indigo plant (*Indigofera suffruticosa*).

Cordia Storkii Standl., sp. nov.—Frutex vix ad 1 m. altus, ramis vetustioribus nigris teretibus, novellis dense stellato-tomentosis; folia inter minora petiolata subcoriacea, petiolo crasso 7–15 mm. longo dense stellato-tomentuloso; lamina ovata vel late ovata 5.5–7.5 cm. longa 3–5 cm. lata apicem obtusum versus paullo angustata, basi rotundata vel truncata et vulgo abrupte contracta atque decurrens, grosse inaequaliter crenato-dentata, supra dense minute asperulo-stellato-pubescens, subtus dense molliter stellato-pilosa; flores capitati albi, capitulis globosis densissime multifloris corollis exclusis 2 cm. diam. longissime pedunculatis; calyx extus minute stellato-pilosulus, basin versus glabratus, tubo anguste campanulato ca. 7 mm. longo, lobis filiformibus saepe aequilongis; corolla magna calyce plus quam duplo longior.—Catalina, Guanacaste, in pasture, June, 1928, *H. E. Stork 2758* (type in Herb. Field Mus.). Bebedero, in thickets, 25 meters, *Brenes 12546*. Orillas del camino de Las Cañas, Guanacaste, 120 meters, *Brenes 12715*. Near *C. globosa* (Jacq.) HBK.; noteworthy for the abundant, stellate pubescence.

Cordia Toqueve Aubl. *C. heterophylla* Roem. & Schult. Guanacaste; San Ramón. Guatemala to Brazil. A tree, usually 5–8 meters high, the young branches more or less brown-hirsute; leaves rather large, broadly oblong to oblong-elliptic, acute or acuminate, obtuse or rounded at the base and usually oblique, entire, very rough on the upper surface, densely and softly pilose beneath; flowers small, white, cymose-paniculate, the panicles mostly rather small and few-flowered; calyx campanulate, 2.5–3 mm. long, not costate; corolla scarcely twice as long as the calyx.

EHRETIA L.

Trees or shrubs; leaves alternate, petiolate, entire or serrate; flowers small, white, arranged in chiefly terminal panicles; calyx 5-parted, open in bud; corolla small, the tube short, the 5 lobes of the limb obtuse, spreading; style bifid; fruit a small drupe.—One additional species of the genus may occur in northern Central America.

Ehretia Austin-Smithii Standl., sp. nov.—*Laurel.* Arbor 25-30 m. alta, trunco usque 2 m. diam., ramulis glabris pallide sparse lenticellatis, internodiis brevibus; folia mediocria petiolata rigide

herbacea in sicco saepius fusca, petiolo 10–12 mm. longo glabro; lamina late ovata vel ovato-elliptica 6–9 cm. longa 4–5 cm. lata acuta, basi rotundata vel truncata, fere ad basin inaequaliter adpresso-serrata, supra sublucida sparse scabra, tactu asperula vel interdum asperrima, subtus fere concolor, sat dense pilis albidis hispidula vel scaberula, interdum glabrata, costa elevata, nervis lateralibus utroque latere ca. 8 angulo lato abeuntibus; inflorescentia terminalis dense cymoso-paniculata foliis vix longior, ca. 7 cm. longa, multiflora, ramis glabris vel glabratis, floribus sessilibus vel brevissime pedicellatis; calyx 2 mm. longus ad medium vel profundius lobatus, glaber, lobis late ovalibus apice rotundatis ciliatis; corolla extus glabra, tubo vix calyce longiore, lobis latis patentibus.—Zarcero, in pasture, 1,850 meters, March, 1938, *Austin Smith H528* (type in Herb. Field Mus.); September, 1937, *No. A384*. In potrero, Santa María de Dota, 1,500 meters, *Standley & Valerio 44145* (sterile). Reported also from Cerro de La Carpintera. The Costa Rican tree has been referred to *E. Luxiana* Donn. Smith, a Guatemalan species, in which the leaves are glabrous. *E. Austin-Smithii* is related to the Mexican *E. latifolia* DC., but in that the calyx lobes are narrow and acute. Regarding this tree, Mr. Smith's notes supply the following information: Growing alone in a wet pasture, or in the open along roadsides; crown very broad, the branching low, sometimes with several trunks from the base; bark thick, dark brown to nearly black, roughened, corrugated, and sutured; cambium layer thick, cream-colored, cutting like cheese; corollas bell-shaped, white, 5-lobed, 5 mm. broad, the lobes reflexed, the stamens shortly exserted; anthers brown; fruits ovoid, to 20 mm. long and 15 mm. thick, rich, creamy yellow, turning dark brown in age; leaves very scabrous, used locally for scrubbing and scouring.

HACKELIA Opiz

Reference: Brand, Pflanzenreich IV. 252: 117. 1931.

Usually perennial herbs, erect, the leaves alternate, membranaceous; flowers small, blue, pedicellate, in scorpioid racemes, these usually paniculate; calyx deeply parted; corolla funnelform to campanulate or rotate; stamens included; style and stigma simple; fruit of 4 small nutlets, these armed with small spines.—One other Central American species has been described from Guatemala.

Hackelia costaricensis (Brand) I. M. Johnston, Contr. Gray Herb. 68: 46. 1923. *Lappula costaricensis* Brand, Repert. Sp. Nov. 18: 310. 1922. "San José," *Hoffmann 152*. Endemic. Known

certainly only from the original collection. Plants 30 cm. high or more, branched above, the stems villous; cauline leaves elliptic, 6–7 cm. long, 1.5–2.2 cm. wide, pilose; corolla 3 mm. long; nutlets all alike, 4 mm. long, covered on the outer surface with spines that are all equal in length.

Hackelia mexicana (Cham. & Schlecht.) I. M. Johnston. *Echinospermum mexicanum* Hemsl.; *Lappula mexicana* Greene. Frequent in thickets on the upper slopes of the central mountains, 2,400–3,000 meters; Cerro de La Muerte. Mexico to Ecuador. Plants a meter high or less; basal leaves long-petiolate, obovate or elliptic, pilose or hirsute; pedicels elongate in fruit and recurved; corolla 3–4 mm. long; nutlets dissimilar, 1 or 2 with long spines, the other 1–3 with very short spines. Most of the specimens seen are in flower and without nutlets, so it can not be determined to which of the two Costa Rican species (if these are really distinct) they are to be referred.

HELIOTROPIUM L.

Herbs or shrubs; leaves alternate, entire; flowers small, white or blue, mostly in dichotomous, terminal, corymbose cymes; calyx 5-parted, the segments narrow; corolla tube cylindric, sometimes ampliate at the insertion of the stamens, naked in the throat, the 5 lobes broad or narrow; stamens included; ovary undivided, 4-celled, the style terminal, simple; fruit drupaceous, small, fleshy or corky, the 4 pyrenes usually distinct.—Other species have been collected in Central America.

Heliotropium angiospermum Murr. *Cola de alacrán. H. parviflorum* L. Thickets or waste ground of the Pacific tierra caliente. Generally distributed in tropical America. Plants slender, often much branched, usually a meter high or less, herbaceous or suffrutescent, sparsely hirsute or hirtellous; leaves lanceolate to ovate, 3–10 cm. long, acute or obtuse, petiolate; spikes mostly slender and often much elongate, not bracteate; corolla white, 2 mm. long; fruit at maturity separating into two 2-celled nutlets.

Heliotropium curassavicum L. Saline flats along the Pacific coast. Widely distributed in tropical and subtropical regions of both hemispheres. Plants annual or perennial, prostrate or decumbent, very fleshy, glabrous; leaves narrowly or broadly oblanceolate, 2–4 cm. long, often glaucous; flowers white, in bractless, solitary or geminate, scorpioid spikes 1–10 cm. long; corolla 2–3 mm. long. A

characteristic plant in some regions of America, confined to saline or strongly alkaline soil; infrequent in Central America.

Heliotropium indicum L. *Alacrán, Alacrancillo, Lagartillo.* A common weed of the Pacific tierra caliente, growing in waste ground or thickets, ascending the Pacific slope to the Meseta Central, but there infrequent; occasional in the Atlantic tierra caliente; Guanacaste. Widely distributed in the tropics of both hemispheres; probably of American origin. A coarse, erect, pale-hirsute annual, usually less than a meter high, branched; leaves petiolate, broadly ovate or elliptic to lanceolate, repand or undulate, acute, subcordate to acute at the base; flowers pale blue, in long, bractless, scorpioid spikes; corolla 5–8 mm. long; fruit glabrous, deeply bilobate, breaking up into 4 angulate nutlets 2–3 mm. long. The crushed leaves are applied as poultices to boils, to bring them to a head. A decoction of the roots is employed in domestic medicine as a diaphoretic. This weed is abundant in many parts of the Central American tierra caliente, but quite lacking in others.

Heliotropium lagoense (Warm.) Guerke. Buenos Aires, 480 meters; reported from the region of El General; probably a plant of savannas. Extending to Bolivia and Brazil. Plants annual, the stems slender, prostrate, appressed-pilose with rather long, white hairs; leaves oblanceolate, 5–15 mm. long, obtuse or subacute; flowers borne singly along the very leafy stems, extra-axillary; pedicels 1–3 mm. long; corolla white, 3–4 mm. long; nutlets 1.5–2 mm. long, glabrous.

Heliotropium peruvianum L. *Heliotropio. Heliotrope.* Cultivated in gardens as an ornamental plant. Native of Peru. Noteworthy for its very fragrant, usually purple flowers, borne in dense, terminal inflorescences.

Heliotropium procumbens Mill. *H. inundatum* Swartz. Frequent in the Pacific tierra caliente, along roadsides or most often in dried stream beds, or about dried-up ponds; collected also as a weed about San José; Guanacaste. Widely distributed in tropical and subtropical America. Plants annual, sparsely or densely appressed-pilose, usually grayish, the stems erect or decumbent, 10–50 cm. long, much branched; leaves elliptic, obovate, or broadly oblanceolate, 1–4 cm. long, obtuse or rounded at the apex, petiolate; flowers small, white, in slender, scorpioid, mostly geminate or ternate, bractless racemes; corolla 5 mm. long or less; fruit depressed-globose, 4-lobate, strigose, the nutlets 0.5–1 mm. long.

Heliotropium transalpinum Vell. Between Heredia and Santo Domingo, 1,130 meters, *Brenes 13230*. Central America to Argentina. Plants slender, suffrutescent, much branched, 1.5 meters high or less; leaves short-petiolate, narrowly oblong-lanceolate, mostly 5–12 cm. long, long-acuminate at each end, green and glabrate; flowers small, white, in long, slender, somewhat interrupted, solitary, bractless racemes, the pedicels very short; corolla about 3 mm. long; fruit ovoid-globose, 4 mm. long. The minute hairs found on some parts of the plant are malpighiaceous, that is, straight, closely appressed, and attached by the middle.

MYOSOTIS L.

Low, annual or biennial herbs, more or less pubescent, branched; leaves alternate, entire; flowers small, blue or white, in elongate, bractless, more or less scorpioid racemes; calyx 5-cleft, the segments narrow; corolla salverform, the limb 5-lobate, the throat crested; stamens included; ovary 4-parted, the style simple, filiform; fruit of 4 nutlets, these erect, glabrous or pilose, attached by their bases to the receptacle.—No species of the genus are native in Central America.

Myosotis arvensis (L.) Hill. Naturalized in the potreros of Volcán de Turrialba, doubtless imported with grass seed. Native of Europe. Plants slender, erect, hirsute, 50 cm. high or usually lower; leaves oblanceolate, obtuse, sessile or petiolate; racemes lax, the fruiting pedicels longer than the calyx; hairs of the calyx, at least in part, uncinate at the tip; corolla blue, 3–4 mm. broad.

Myosotis scorpioides L. *No-me-olvides. Forget-me-not.* Sometimes grown in gardens as an ornamental plant. Native of Europe. Hairs of calyx straight and closely appressed; corolla 6–8 mm. broad.

TOURNEFORTIA L.

Usually scandent shrubs, the leaves alternate, entire, glabrous or usually with harsh pubescence; flowers small, white or greenish, secund, in terminal, usually dichotomous cymes, the branches often greatly elongate; calyx 5-parted, persistent, the segments commonly narrow; corolla most often salverform, the cylindric tube ampliate above; stamens included; ovary 4-celled, the style terminal, bilobate at the apex; drupe small, the exocarp fleshy or corky, containing 4 or fewer hard nutlets.—A few other species are known from Central America.

Tournefortia angustiflora Ruiz & Pavón. *T. Billbergiana* Beurl. Thickets of the Atlantic tierra caliente. Honduras to Peru. A rather stiff shrub, sometimes not at all scandent, but often a large vine, the stems sparsely hispidulous or glabrâte; leaves short-petiolate, ovate to elliptic, mostly 7–12 cm. long, acute or obtuse, obtuse or acute at the base and abruptly decurrent, sparsely puberulent or almost glabrous; branches of the cymes short and rather densely flowered; sepals broadly ovate, about 1.5 mm. long; corolla greenish white, 15 mm. long, sparsely strigillose, the lobes broadly ovate, apiculate; fruit globose, elobate, white, glabrous.

Tournefortia bicolor Swartz. Frequent in thickets and forest of the tierra caliente; region of San Ramón, at 1,200 meters or less; Villa Colón. Widely distributed in tropical America. A small or large, woody vine, the branches sparsely pilose or almost glabrous; leaves petiolate, ovate to lance-ovate or elliptic, mostly 6–14 cm. long, acute, obtuse or rounded at the base, sparsely short-pilose, especially beneath, or almost wholly glabrous; inflorescence much branched, often large, dense at first but open in age; sepals lanceolate or ovate, 1–2.5 mm. long; corolla white, the tube 4–5 mm. long, strigose, the limb 6–7 mm. broad; fruit juicy, white, glabrous, 8 mm. long, elobate. This, like other species of the genus, is often a weedy shrub of cutover lands.

Tournefortia bicolor var. **calycosa** Donn. Smith. Los Angeles de San Ramón, *Brenes 6123*. Guatemala to Peru. Like the typical form of the species, but the sepals 3–4 mm. long, linear or lanceolate. The single Costa Rican specimen is in fruit and not altogether satisfactory for study. Possibly it represents a species distinct from *T. bicolor*, for the sepals are almost filiform and about 5 mm. long.

Tournefortia Brenesii Standl., sp. nov.—Frutex ut dicitur 1 m. tantum altus, vulgo simplex, caule dense foliato crasso subtereti, ramulis novellis dense adpresse villoso-tomentosis, foliis in axillis aliis valde reductis saepe auctis; folia inter maxima breviter petiolata membranacea, petiolo gracili usque 3 cm. longo sed saepe fere ad basin marginato; lamina anguste oblanceolato-oblonga ad oblongo-obovata 18–35 cm. longa 5.5–10 cm. lata vel ultra, acuminata, basin versus longe sensim attenuata, supra in sicco fusco-viridis glabra, subtus paullo pallidior ubique minutissime sparsissime strigillosa, ad nervos venasque minute puberula, nervis lateralibus utroque latere ca. 15 valde obliquis angulo semirecto adscendentibus, costa crassa, nervis gracillimis paullo prominentibus; inflorescentia laxa multi-

flora foliis aequilonga vel paullo brevior repetite dichotoma longipedunculata, ramis breviter viscido-hirtellis, floribus sessilibus vel usque 2 mm. longe pedicellatis; sepala lineari-lanceolata 3–4 mm. longa attenuata minute puberula in statu fructifero vix aucta; corolla alba extus sparse puberula, tubo late ovoideo 6 mm. longo, lobis anguste triangulari-oblongis longiacuminatis ca. 4 mm. longis patentibus; drupa alba succosa late ovoideo-globosa ca. 7 mm. lata elobata.—El Silencio (Los Angeles) de San Ramón, February, 1933, *Brenes 17103* (type in Herb. Field Mus.). La Palma de San Ramón, 1,300 meters, *Brenes 3925, 3758, 5530, 3999.* Near Tapesco de Zarcero, 2,000 meters, *Austin Smith H422.* An exceptionally well marked species because of the very large and narrow, almost glabrous leaves. It is probably related to *T. subspicata* Donn. Smith, the type of which I have not seen. If, however, the description of that species is at all accurate, it and the present plant are quite distinct.

Tournefortia cuspidata HBK. *T. obscura* DC. Changuinola Valley, and doubtless elsewhere in the Atlantic tierra caliente. Extending to West Indies and Bolivia. A small or large, woody vine, the branches densely covered with very long, brown, spreading hairs; leaves short-petiolate, lance-ovate to lanceolate or elliptic-oval, 7–15 cm. long, narrowly long-acuminate, rounded or obtuse at the base, densely pilose on both surfaces; inflorescence usually very dense and often congested, hirsute, the spikes short; sepals subulate or linear, 7–9 mm. long; corolla white, the tube 5–8 mm. long, densely strigose; fruit white, juicy, ovoid, 8 mm. long, glabrous, elobate.

Tournefortia glabra L. *Maíz de gallo.* Frequent in thickets of the Meseta Central; region of Dota; region of San Ramón; Atlantic tierra caliente; Guanacaste, at least on Atlantic slope, up to 2,000 meters. Southern Mexico to Panama and West Indies. A scandent shrub, or often erect, said to be sometimes a tree of 6 meters with brown or light gray bark, the branchlets puberulent or glabrate; leaves thin, slender-petiolate, lanceolate to ovate, mostly 8–15 cm. long, acuminate at each end and often long-decurrent upon the petiole, sparsely short-pilose or sericeous or almost glabrous; spikes slender and often greatly elongate, the inflorescence lax and open; calyx lobes lanceolate, long-acuminate, about 2 mm. long; corolla pale green or whitish, the tube 4 mm. long, the lobes narrow, long-acuminate; fruit white, juicy, as much as 9 mm. long, not lobate. This is probably the most common species of the genus in Costa Rica. The wood is bright yellow when cut.

Tournefortia hirsutissima L. Thickets and forests of the Pacific tierra caliente, ascending to 1,000 meters; region of San Ramón; Guanacaste; reported from the region of Dota. Widely distributed in tropical America. A large or small, woody vine, the branches densely hirsute or hispid; leaves thin, short-petiolate, lance-oblong to elliptic or ovate, mostly 7–12 cm. long, acuminate or narrowly long-acuminate, rounded to acute at the base, very scabrous above, usually hirsute beneath; flowers white, the inflorescence large or small, usually dense, hirsute; sepals linear or oblong, acute, 3 mm. long or less; corolla tube 4–5 mm. long, the lobes broad, rounded, apiculate; fruit small, subglobose, densely hispidulous. The stiff hairs penetrate the flesh easily, and are somewhat irritant.

Tournefortia Johnstonii Standl., sp. nov.—Frutex scandens vel suberectus usque 3.5 m. altus, ramulis crassis obtuse quadrangulatis dense breviter hispidis, foliis in axillis aliis parvis stipuliformibus auctis; folia magna petiolata crasse membranacea, petiolo crasso 1.5–5.5 cm. longo hispido; lamina elliptico-ovata vel elliptico-lanceolata 13–27 cm. longa 5.5–11 cm. lata longe anguste acuminata, basi acuta vel saepius abrupte longiacuminata, supra asperrima dense hispida vel hispidula, subtus densissime albido-papillosa atque hispida; inflorescentia longipedunculata 2–3-dichotoma, spicis dense vel laxe multifloris 6–12 cm. longis, floribus arcte sessilibus; sepala anguste lineari-attenuata ca. 9 mm. longa hispidula et albido-papillosa; corolla viridi-flavescens extus breviter hispidula, tubo gracili superne non dilatato 1 cm. longo, lobis patentibus vel subrecurvis 4–5 mm. longis late triangularibus subulato-acuminatis.—Wet forest, Cerro de Las Caricias, north of San Isidro, Prov. Heredia, 2,000–2,400 meters, *Standley & Valerio 52087* (type in U. S. Nat. Herb.), *52121*. La Hondura, Prov. San José, 1,300–1,700 meters, *Standley 36601*. Las Nubes, Prov. San José, 1,500–1,900 meters, *Standley 38671*. Yerba Buena, northeast of San Isidro, 2,000 meters, *Standley & Valerio 50076, 49777*. La Hondura de San José, 1,300 meters, *M. Valerio 772*. An unusually well marked species, not clearly related to any other of the region. It is named for Dr. Ivan M. Johnston, who has monographed the genus *Tournefortia* as represented in northeastern South America.

Tournefortia paniculata Cham. In thickets or hedges, region of San Ramón and in the Pacific tierra caliente, at 1,100 meters or less. Extending to Brazil. A rather slender, woody vine, the young branches rather densely fulvous-pilosulous; leaves rather small, ovate to lance-ovate or elliptic-oblong, mostly 4–8 cm. long,

acute or acuminate, rounded to subacute at the base, at least when young sparsely or densely fulvous-pilosulous; inflorescence slender and lax, repeatedly branched, the spikes short; sepals 1–1.5 mm. long, subulate to ovate; corolla greenish, the tube usually 3–4 mm. long, sometimes longer, the lobes broad at the base, long-acuminate; fruit small, conspicuously 4-lobate. The Costa Rican material is referred by Johnston (Journ. Arn. Arb. 16: 49. 1935) to var. *spigeliaeflora* (A. DC.) I. M. Johnston.

Tournefortia poasana Cufodontis, Archivio Bot. 10: 42. 1934. Slopes of Volcán de Poás, 2,400 meters, *Cufodontis 600* (type collection seen, in Herb. Field Mus.). Collected also by the present writer at La Esperanza, southern slope of Volcán de Irazú. Endemic. A shrub of 4 meters or less, the stout branchlets almost glabrous; leaves slender-petiolate, ovate-lanceolate to broadly ovate, mostly 7–14 cm. long, acuminate, acute and more or less decurrent at the base, glabrous above, very sparsely appressed-pilosulous beneath along the nerves or almost wholly glabrous; inflorescence pedunculate, the few spikes 6 cm. long or less, the branches sparsely pilosulous; sepals 5 mm. long, lanceolate, acute, sparsely strigose; corolla green or yellowish, about 1 cm. long, sericeous-strigose; fruit white, globose, 8 mm. in diameter.

Tournefortia ramonensis Standl., sp. nov.—Frutex 1–2-metralis, ramulis obtuse tetragonis crassis densissime breviter ferrugineo-tomentosis, internodiis elongatis; folia magna subcoriacea, petiolo crasso 1.5–5 cm. longo dense tomentoso; lamina ovata vel oblongo-ovata 13–18 cm. longa 5.5–7 cm. lata (interdum usque 14 cm. lata atque sine dubio multo longior) anguste longiacuminata, basi acuta vel saepius obtusa vel rotundata atque subito contracta et longe decurrens, supra dense pilosula asperula, subtus densissime molliter ferrugineo-tomentosa vel hispidula, costa crassa elevata, nervis lateralibus parum conspicuis; inflorescentia 1–2-dichotoma pedunculata, ramis fructiferis usque 17 cm. longis dense ferrugineo-hispidulis multifloris, floribus sessilibus vel pedicellis crassis usque 2 mm. longis stipatis; sepala crassa lanceolata attenuata dense ferrugineo-strigosa in statu florifero 3 mm. longa, serius accrescentia atque usque 6 mm. longa; corolla extus densissime ferrugineo-strigosa, vix ultra 5 mm. longa, lobis tubo duplo brevioribus latis obtusis; drupa late ovoideo-globosa 5 mm. longa 7 mm. lata glabra.—Los Angeles de San Ramón, April, 1928, *Brenes 6118* (type in Herb. Field Mus.). Alto de La Palma de San Ramón, 1,300 meters, *Brenes 3783*.

Tournefortia subspicata Donn. Smith, Bot. Gaz. 25: 151. 1898. Plateau of Volcán de Turrialba, 2,700 meters, *Pittier 877*. Plants almost glabrous outside the inflorescence; leaves long-petiolate, obovate-elliptic, 10–12 cm. long, 4–6 cm. wide, acuminate at each end, minutely lepidote on the upper surface, sparsely pubescent beneath on the nerves; inflorescence several times dichotomous, flavescent-strigillose; sepals glabrous, ovate-lanceolate, 4 mm. long; corolla strigillose, the tube 7 mm. long, the lobes ovate-lanceolate, acute; ovary glabrous.

Tournefortia syringaefolia Vahl. *T. peruviana* Poir. Thickets of the Atlantic tierra caliente. British Honduras to Brazil and Peru. A woody vine, the branches sparsely short-pilose or almost glabrous; leaves short-petiolate, ovate to broadly lanceolate, mostly 4–10 cm. long, acuminate, rounded to acute at the base, sparsely short-strigose or glabrate; inflorescence laxly branched, large or small, the spikes 5 cm. long or less; pedicels much thickened in fruit, short; corolla greenish white, the tube commonly 3–4 mm. long, sometimes longer, the lobes long-acuminate; fruit yellow or yellowish, conspicuously 4-lobate.

VERBENACEAE. Verbena Family

Herbs, shrubs, or trees, sometimes scandent; leaves opposite, verticillate, or rarely alternate; flowers perfect, regular or irregular, mostly spicate, racemose, cymose, or paniculate; calyx inferior, commonly persistent, 4–5-lobate or 4–5-cleft; corolla gamopetalous, the tube cylindric, the limb 4–5-cleft; stamens 4, didynamous, rarely 2, or as many as the corolla lobes, inserted on the corolla alternate with the lobes, the anthers 2-celled, the sacs longitudinally dehiscent; ovary superior, 2–4-celled, composed of 2 carpels, each carpel with 2 ovules, the 4-celled ovaries with 1 ovule in each cell; style terminal, the stigmas 1 or 2; fruit dry and separating at maturity into 2–4 nutlets, or drupaceous and containing 2–4 nutlets.—The genus *Bouchea* is represented in Central America, and perhaps in Costa Rica.

AEGIPHILA Jacq.

Reference: Moldenke, A monograph of the genus *Aegiphila*, Brittonia 1: 245–477. 1934.

Shrubs or small trees; leaves opposite, entire or nearly so; flowers small, in axillary or terminal, usually paniculate cymes; calyx subtruncate, 4-dentate or rarely 5-dentate, more or less enlarged in fruit; corolla tube cylindric, or dilated above, the limb usually

4-lobate, the lobes equal; stamens usually 4, the anther sacs parallel; ovary incompletely 4-celled, the stigma lobes 2, filiform; fruit drupaceous, containing 1–4 nutlets.—Several additional species occur in Central America, and a few of them, known at present from Nicaragua or Panama, may be expected in Costa Rica.

Aegiphila aculeifera Moldenke. Cerro de La Muralla de San Ramón, 1,300 meters, *Brenes 5709*. Colombia. A shrub, the young branches densely furfuraceous, often armed with minute, recurved prickles; leaves opposite, obovate-oblong, mostly 12–20 cm. long, acute or acuminate, attenuate to the acute base, more or less furfuraceous on both surfaces, especially along the nerves and veins; inflorescences small, supra-axillary, the cymes mostly as long as the petioles or shorter, laxly many-flowered, densely stellate-furfuraceous; calyx obconic, 0.7 mm. long, densely pulverulent, somewhat bilabiate, the lobes 2 mm. long; corolla white, the tube 8 mm. long, the 4 lobes 6 mm. long. The recurved prickles which Moldenke emphasizes as covering the branches and inflorescence of this species are not in evidence in the Costa Rican collection, determined by him. They are, however, very apparent in the type specimen of the species, which was collected in Colombia.

Aegiphila anomala Pittier, Contr. U. S. Nat. Herb. 12: 181. *f. 19*. 1909. *Tabaquillo*. Forests of Río Hondo, Llanos de Santa Clara, Atlantic tierra caliente, *Pittier 16711*. Siquirres; region of San Ramón; El Silencio de Tilarán. Endemic. A shrub or small tree of 4.5 meters, the branches densely ochraceous-puberulent; leaves short-petiolate, oblanceolate or oblong-obovate, mostly 10–20 cm. long, acute or abruptly short-acuminate, long-attenuate to the base, entire, densely and minutely puberulent on both surfaces; cymes small and dense, axillary, 3 cm. long or less, few-flowered, the branches densely puberulent; calyx 1 cm. long, densely puberulent, 3–5-lobate; corolla rotate or salverform, the tube 4.5–7 mm. long, the 5 lobes 6 mm. long; fruit glabrous, globose, about 1 cm. in diameter. Notes by Austin Smith, based upon material collected recently about Zarcero, supply the following information: At 1,700–1,950 meters, on clay ridges in open forest; a tree 11–15 meters high, of open growth, the trunk 45–60 cm. in diameter; bark brown, corklike in structure, well sutured, thick; cambium layer cream-yellow; leaves soft and rather lax, light green, velvety to the touch; flower buds buffy yellow, the corolla pure white.

Aegiphila costaricensis Moldenke, Repert. Sp. Nov. 33: 119. 1933. Forests of Shirores, Talamanca, 100 meters, *Pittier & Tonduz*

9167. Pacific tierra caliente and probably also in the Atlantic; Guanacaste. Panama to Mexico. A shrub or small tree, the branches glabrous; leaves opposite or ternate, almost sessile, lance-oblong to obovate, 7–20 cm. long, acute or acuminate, attenuate to the base, entire, glabrous; cymes axillary, usually 3-flowered, the pedicels 1–1.5 cm. long, glabrous; calyx 5 mm. long, glabrate, the limb 4-lobate; corolla tube 4 mm. long, the 5 lobes 6 mm. long; fruit ovoid, 5 mm. long, umbilicate. There is some doubt as to whether this plant is properly referable to *Aegiphila*, or, in fact, to the Verbenaceae.

Aegiphila Deppeana Steud. Guanacaste; reported from San José. Mexico to Colombia and French Guiana. A shrub or tree, 7 meters high or less, sometimes subscandent, the branches densely tomentose; leaves short-petiolate, ovate or oblong-ovate, 5–15 cm. long, acute, acuminate, or short-cuspidate, cuneate at the base, entire, glabrate above, tomentose beneath; cymes axillary and terminal, half as long as the leaves, many-flowered, the branches tomentose; calyx 4 mm. long, tomentose, 4-dentate; corolla white or pale yellow, glabrous, the slender tube 5–12 mm. long, the 4 lobes 4 mm. long; fruit 8–10 mm. long.

Aegiphila elata Swartz. Thickets of the tierra caliente; region of San Ramón; at 1,000 meters or less. Southern Mexico to West Indies and Bolivia. A shrub, the branches sometimes long and subscandent, glabrous or nearly so; leaves short-petiolate, ovate to oblong or elliptic, mostly 8–15 cm. long, abruptly short-acuminate, obtuse or rounded at the base, entire, glabrous above, appressed-pilose beneath along the nerves or almost glabrous; cymes axillary and terminal, often forming a rather large and open panicle, the pedicels 4–8 mm. long; calyx 2–4 mm. long, distinctly 4-lobate, puberulent; corolla yellowish, the slender tube 4–8 mm. long, the 4 lobes 3–6 mm. long; fruit subglobose, 7 mm. long.

Aegiphila falcata Donn. Smith. Atlantic tierra caliente. Panama to Guatemala. A tree of 13 meters or less, or a shrub, the branches glabrous; leaves opposite, short-petiolate, oval to obovate-oblong, 17–35 cm. long, rounded to abruptly short-acuminate at the apex, broadly rounded at the base, often somewhat falcate, glabrous; cymes axillary and forming large, terminal, thyrsoid panicles, the pedicels 3 mm. long or less; calyx 3.5 mm. long and wide, subtruncate, acutish at the base, puberulent; corolla pale yellow, the tube 3–15 mm. long, the 4 lobes 6 mm. long; fruit subtetragonal, 4 mm. long.

Aegiphila glandulifera Moldenke. Collected in the region of Alajuela by Hoffmann. Extending to Peru. A shrub, the branches glabrate; leaves short-petiolate, oblong, 12–20 cm. long, acute or acuminate, acute at the base, entire, glabrate and punctulate on both surfaces; cymes solitary, axillary and terminal, 9 cm. long or less, many-flowered, forming a terminal panicle as much as 23 cm. long and 13 cm. wide, the branches glabrous or puberulent, the pedicels 2 mm. long; calyx glabrate, cupuliform, almost 2 mm. long, subtruncate; corolla pale yellow, the tube almost 8 mm. long, the 4 lobes 4.5 mm. long.

Aegiphila magnifica Moldenke. Reported from Guanacaste and Province of San José. Nicaragua to Panama. A shrub, sometimes scandent, the branches densely puberulent; leaves short-petiolate, broadly oblong, 14–20 cm. long, short-acuminate, abruptly acute at the base, entire, finely and obscurely puberulent on both surfaces; cymes axillary and terminal, many-flowered, forming a thyrsoid-pyramidal, terminal panicle as much as 30 cm. long and broad, the branches puberulent; fruiting calyx indurate, cupuliform, 4 mm. long and 9 mm. wide, puberulent; fruit somewhat tetragonal, 7 mm. long.

Aegiphila martinicensis Jacq. Changuinola Valley, and doubtless elsewhere in the Atlantic tierra caliente. Extending to West Indies and Venezuela. A shrub or small tree, the branches very minutely puberulent or glabrous; leaves short-petiolate, thin, oblong-lanceolate to oblong, mostly 10–20 cm. long, acuminate or narrowly long-acuminate, acute to rounded at the base, entire, glabrous or sparsely and inconspicuously puberulent; cymes rather lax, forming a thyrsoid, terminal panicle 17 cm. long or less, the branches puberulent, the slender pedicels 2–4 mm. long; calyx 2–3 mm. long, truncate, minutely puberulent or glabrous; corolla white or pale yellow, the tube 2–6 mm. long, the 4 lobes 3–6 mm. long; fruit subglobose or ovoid, yellow or red, 5–13 mm. long.

Aegiphila odontophylla Donn. Smith, Bot. Gaz. 25: 157. 1898. *A. fusca* Oerst. in herb. Forests of southern slope of Volcán de Barba, 2,100 meters, *Pittier 288*. Wet forests of the central mountains, at 2,000–2,400 meters. Endemic. A shrub or small tree, as much as 10 meters high, the trunk to 30 cm. in diameter, the bark gray or grayish brown, roughened, the branches furfuraceous-tomentose; leaves short-petiolate, opposite, oblong-obovate or elliptic-oblong, 7–15 cm. long, acute or short-acuminate, acute at the base, serrate

along almost the whole margin, more or less granulose-tomentose or furfuraceous-pubescent on both surfaces; cymes all axillary, 2–4.5 cm. long, dense and many-flowered, densely tomentose, the pedicels 1–3 mm. long; calyx 5–6 mm. long, densely furfuraceous, 4-lobate; corolla creamy white, the tube 8 mm. long, glabrous, the 4 lobes 5 mm. long; fruits pale yellow when ripe.

Aegiphila panamensis Moldenke. Thickets of the Atlantic tierra caliente; region of San Ramón, at 1,100 meters or less. Panama. A slender shrub or small tree, the branches densely puberulent; leaves short-petiolate, thin, blackening when dried, oblong-lanceolate to oblong or obovate, 9–17 cm. long, abruptly acute to caudate-acuminate, acute at the base, entire, rather densely puberulent on both surfaces; cymes small, dense or lax, forming a terminal, thyrsoid panicle 30 cm. long or less, the branches densely puberulent, the pedicels 1–2 mm. long; calyx almost 3 mm. long, puberulent, truncate; corolla pale yellowish, glabrous, the tube 5–7.5 mm. long, the 4 lobes 4 mm. long; fruit subglobose, 1 cm. long, truncate.

Aegiphila paniculata Moldenke. Changuinola Valley, and doubtless elsewhere in the Atlantic tierra caliente. Nicaragua to Colombia. A shrub or tree, 10 meters high or less, the bark grayish white, the wood creamy white, the branches glabrous or puberulent; leaves thin, short-petiolate, dark when dried, lanceolate or oblong, 11–18 cm. long, long-acuminate, acuminate or acute at the base, entire, minutely puberulent on both surfaces; inflorescence a terminal, dense, narrow panicle about 14 cm. long, the branches glabrous or puberulent, the pedicels 1–2 mm. long; fruiting calyx cupuliform, truncate, puberulent, 2 mm. long and 7 mm. wide; fruit 1 cm. long, yellow, truncate at the apex. The species is close to *A. panamensis* and perhaps should be united with it.

Aegiphila Standleyi Moldenke, Repert. Sp. Nov. 33: 140. 1933. La Hondura, Prov. San José, 1,300–1,700 meters, *Standley 37570*. Known only from the original collection. A shrub of 3 meters, the branches glabrate; leaves opposite, short-petiolate, obovate, 45 cm. long and 16 cm. wide or smaller, acute or short-acuminate, attenuate to the base, repand-dentate, finely and sparsely puberulent on both surfaces; cymes all axillary, many-flowered, equaling or shorter than the petioles, short-pedunculate, the pedicels 3 mm. long; calyx cupuliform, 3.5–4 mm. long, puberulent, subtruncate; corolla glabrous, the tube 1.3 mm. long, the 4 lobes 1.8 mm. long; fruit subglobose, 7 mm. long, glabrous.

Aegiphila Valerii Standl. Journ. Wash. Acad. Sci. 15: 481. 1925. Tilarán, Guanacaste, 750 meters, *Juvenal Valerio 148*. Known only from the mountains of Guanacaste. A shrub or tree, 13 meters high or less, with a broad crown, the branchlets pale-tomentose; leaves opposite, short-petiolate, obovate, 11–25 cm. long, acute or short-acuminate, cuneate at the base, entire, sparsely and minutely puberulent above, paler beneath and rather densely short-pilose; cymes all axillary, small, 1.5–2 cm. long, rather densely many-flowered, sessile or short-pedunculate, the pedicels very short or none; calyx 4–5 mm. long, truncate, puberulent; corolla glabrous, the tube 3.5 mm. long, the 5 lobes 3 mm. long; fruit 8 mm. long.

AVICENNIA L. Black mangrove

Trees, the leaves opposite, coriaceous, entire; flowers small, whitish, in pedunculate panicles; calyx cupuliform, sericeous, the 5 lobes persistent; corolla campanulate, the tube short, the spreading limb 4-lobate; stamens 4; ovary sessile, 1-celled, 4-ovulate, the style short, bilobate; fruit capsular, obliquely apiculate; seeds usually germinating in the capsule.—One other species is known from Central America (Salvador and Panama, and perhaps Costa Rica).

Avicennia nitida Jacq. *Palo de sal, Culumate.* Abundant in mangrove (*Rhizophora*) swamps of the Pacific coast, and doubtless also of the Atlantic. Widely distributed in the tropics of both hemispheres. A tree of 15 meters or less, the bark shallowly fissured, dark and scaly, the branchlets minutely grayish-pubescent; leaves short-petiolate, narrowly oblong-lanceolate to oblong, mostly 8–13 cm. long, somewhat narrowed to the obtuse or rounded apex, acute at the base, coriaceous, glabrate above, pale beneath, very densely and minutely pubescent; panicles dense, 2–5 cm. long, the flowers densely glomerate; corolla about 1 cm. broad, the lobes rounded; capsule oblong or elliptic, 2–5 cm. long, sparsely pubescent. This species, which often is only a shrub, is one of the characteristic and usual components of the mangrove belt of the seashores of Central America. *Avicennia* grows most often at the landward edges of these swamps, especially on saline flats that are inundated at high tide. The heartwood is dark brown, oily, very hard, heavy, tough, of medium texture and interlocked grain, laminated, and durable, but tending to split at the phloem layers in the wood. It is little used.

Avicennia Tonduzii Moldenke, Phytologia 1: 273. 1938. *Palo de sal.* Punta Mala, Pacific coast, *Tonduz 6776*. Endemic. Similar

to *A. nitida*, of which it may be only a form or variety, but differing in its somewhat smaller flowers.

CALLICARPA L.

Shrubs or small trees; leaves opposite; flowers small, purple or white, in axillary cymes; calyx small, campanulate, 4-dentate or truncate; corolla tube short, dilated above, the limb 4-cleft, the lobes equal; stamens 4, equal, exserted, the anther sacs parallel; ovary incompletely 2-celled, the ovules 2 in each cell; style slender, the stigma lobes 2; fruit a berry-like drupe, containing 1–4 nutlets.—No other species are native in Central America.

Callicarpa acuminata HBK. Occasional in thickets of the tierra caliente. Mexico to Bolivia. A shrub of 2–3 meters, the branches densely stellate-tomentose; leaves short-petiolate, ovate-oblong to elliptic, mostly 8–15 cm. long, acute to long-acuminate, acute at the base, more or less dentate or subentire, green above and glabrate, densely stellate-tomentose beneath or sometimes glabrate; cymes small or large, densely many-flowered, densely stellate-tomentose; calyx 1–1.5 mm. long, truncate; corolla white, 2.5–3.5 mm. long; drupes dark purple or black, glabrous, subglobose, 3–4.5 mm. long.

CITHAREXYLUM L.

Trees or shrubs; leaves opposite, entire; flowers small, in terminal or axillary spikes or racemes, the pedicels bracteolate; calyx narrowly canpanulate or tubular, minutely 5-dentate, persistent; corolla salverform, the limb 5-lobate, slightly asymmetric; stamens 4 or 5, the fifth one usually sterile or rudimentary, the filaments filiform; ovary incompletely 4-celled, the stigma bilobate; fruit drupaceous, fleshy, the osseous stone separating into two 2-seeded nutlets.—A few additional species are known from Central America.

Citharexylum caudatum L. *Dama.* In thickets of the Atlantic coast. Yucatan to Mexico and West Indies. A shrub or small tree, the branches terete, glabrous; leaves oblong, 7–15 cm. long, obtuse or rounded at the apex, acute at the base, glabrous, lustrous above, short-petiolate; racemes slender and greatly elongate, the pedicels 2–3 mm. long; calyx campanulate, 3 mm. long, subtruncate; corolla white, the tube twice as long as the calyx, the limb 4–5 mm. broad; drupe globose-oblong, black and shining. The long and graceful racemes of fruit make the tree a rather showy one.

Citharexylum Cooperi Standl. Changuinola Valley. Adjacent Panama. A small tree, the branchlets acutely quadrangular, short-pilose at first with spreading hairs, later glabrate; leaves short-petiolate, pale, ovate to oblong-elliptic, 7–16 cm. long, acuminate, acute and sometimes decurrent at the base, glabrous above or nearly so, densely velutinous-pilose beneath; racemes paniculate, 2–5 cm. long, dense, the rachis short-pilose, the pedicels less than 1 mm. long; calyx narrowly campanulate, 4 mm. long, sparsely hirtellous; corolla tube 2.5 mm. long, the obtuse lobes 2 mm. long, minutely puberulent; fruit globose, 8 mm. long.

Citharexylum costaricense Moldenke, Repert. Sp. Nov. 37: 219. 1934. La Palma, Prov. San José, 1,460 meters, *Tonduz 7369*. Collected also at San Pedro Coronado, 1,400 meters. Endemic. Branches subtetragonous, glabrous; leaves short-petiolate, oblong-elliptic, 10–20 cm. long, 7–10 cm. wide, acute or short-acuminate, rounded at the base, glabrous; racemes paniculate, 8–20 cm. long, the rachis glabrous or sparsely puberulent, the pedicels 1 mm. long or less; calyx campanulate, 3.5 mm. long, glabrous, truncate; corolla tube 3.5 mm. long, the lobes 2 mm. long, puberulent.

Citharexylum Donnell-Smithii Greenm. *Dama*. Frequent in forests, thickets, and hedges of the central region, mostly at 1,200–2,000 meters. Ranging to Guatemala. A tree, sometimes 15 meters high, the trunk as much as 60 cm. in diameter, the crown dense and usually rounded, the branches terete, glabrous; bark almost black, much furrowed and roughened; leaves slender-petiolate, lanceolate or lance-oblong, mostly 10–20 cm. long and 3–5 cm. wide, acute to long-acuminate, acute at the base, glabrous; racemes terminal and solitary, 10–35 cm. long, slender and recurved, the pedicels 2–3 mm. long, the flowers fragrant; calyx tubular-campanulate, 3 mm. long, glabrous; corolla white, 6 mm. long, glabrous outside; drupes glabrous and lustrous, 6 mm. long. The tree is a handsome and showy one because of the abundant, long racemes of orange or red drupes, which finally turn black. The fruits are said to be much eaten by wild pigeons.

Citharexylum integerrimum (Kuntze) Moldenke, Phytologia 1: 17. 1933. *C. villosum* Jacq. var. *integerrimum* Kuntze, Rev. Gen. 2: 504. 1891. Costa Rica, without definite locality, *Kuntze*. Collected by Brenes in Guanacaste. Endemic. Branches sharply quadrangular, minutely pilosulous or glabrate; leaves ovate or elliptic, slender-petiolate, about 6 cm. long and 3 cm. wide, acute or short-

acuminate, abruptly contracted and decurrent at the acute base, glabrous; racemes slender, paniculate, 2–5 cm. long, the rachis minutely pilose, the slender pedicels 1–1.5 mm. long; calyx narrowly campanulate, 2.5 mm. long, sparsely puberulent, conspicuously dentate; corolla twice as long as the calyx, the lobes sparsely puberulent outside. No proper description of this species has been published, the present one being drawn from the Brenes collection, which may not be typical.

Citharexylum Lankesteri Moldenke, Repert. Sp. Nov. 37: 229. 1934. Paso Ancho, Volcán de Irazú, 1,700 meters, *Lankester 243*. Known only from the original collection. Branchlets obtusely quadrangular, densely stellate-tomentose; leaves slender-petiolate, ovate-oblong or oblong-elliptic, 17–21 cm. long, 7–8 cm. wide, acuminate, acute and decurrent at the base, glabrous above or nearly so and lustrous, densely stellate-tomentose beneath; racemes axillary and terminal, simple, 10–25 cm. long, the rachis stellate-tomentose, the pedicels 2 mm. long or less; calyx campanulate, 3.5 mm. long, puberulent, 5-dentate; corolla tube 3.5 mm. long, the lobes almost 3 mm. long, pubescent.

Citharexylum macradenium Greenm. Field Mus. Bot. 2: 188. 1907. La Palma, Prov. San José, 1,460 meters, *Tonduz 7407*. In forests, mountains of the central region, mostly at 1,100–2,000 meters; region of San Ramón. Endemic. A large shrub or small tree, glabrous throughout, the branches 4-angulate; leaves petiolate, lanceolate or elliptic-lanceolate, 7–15 cm. long, 2–3.5 cm. wide, acute at each end; racemes simple or paniculate, erect or recurved, short or elongate, the pedicels 1.5 mm. long or less; calyx campanulate, 2.5 mm. long, subtruncate; corolla white, the tube 4 mm. long, the lobes 2 mm. long, puberulent; fruit lustrous, subglobose, 1 cm. long or less.

Citharexylum recurvatum Greenm. Field Mus. Bot. 2: 189. 1907. Río Reventado, Prov. Cartago, 1,830 meters, *Cooper 5889*. Also in Panama. Branchlets terete, glabrous; leaves petiolate, lance-oblong to subovate, 4–11 cm. long, 1.5–3.5 cm. wide, obtuse to acute, acute at the base, glabrous; racemes simple or paniculate, the pedicels 2–3 mm. long; calyx tubular-campanulate, 3 mm. long, minutely 5-denticulate, glabrous; fruit oblong, 5–7 mm. long, bluish black.

Citharexylum Standleyi Moldenke, Repert. Sp. Nov. 37: 234. 1934. Forests of Sipurio, Talamanca, 100 meters, *Tonduz 8735*. Known only from the original collection. Branchlets acutely quad-

rangular, puberulent or glabrate; leaves slender-petiolate, elliptic or oblong-elliptic, 5–18 cm. long, 2.5–7.5 cm. wide, acute or abruptly short-acuminate, acute at the base, lustrous on both surfaces, glabrous or beneath sparsely and minutely puberulent; racemes terminal, simple, recurved, 14–45 cm. long, laxly many-flowered, the pedicels 1–1.5 mm. long; calyx 3.5–4 mm. long, tubular-campanulate, glabrous, truncate.

Citharexylum viride Moldenke. Puerto Jiménez, Pacific coast, *Brenes 12332*. Panama. A shrub of 2.5–3 meters, sometimes a tree of 7 meters, the branches acutely quadrangular, puberulent or glabrate; leaves short-petiolate, oblong-elliptic to subobovate, 7–13 cm. long, 3–5.5 cm. wide, green and lustrous when dried, acute or acuminate, acute at the base, sparsely puberulent above, densely puberulent beneath and often barbate along the costa; racemes simple or paniculate, 3–14 cm. long, densely many-flowered, the pedicels 1 mm. long, puberulent; fruiting calyx 3.5 mm. long, minutely puberulent or glabrate, 5-dentate; fruit oblong, 7 mm. long.

CLERODENDRON L.

Shrubs, herbs, or small trees, sometimes scandent, often armed with spines; leaves opposite, entire or dentate; flowers large or small, in terminal or axillary cymes or panicles; calyx 5-dentate or 5-parted; corolla salverform or funnelform, the tube short or elongate; stamens 4, somewhat unequal, exserted; ovary 4-celled, the stigma bilobate; fruit drupaceous, the 4 nutlets free or united in pairs.—One other species is native in Central America.

Clerodendron costaricense Standl., sp. nov.—Frutex scandens 5-metralis praeter inflorescentiam glaber, ramis gracilibus subteretibus ochraceis, internodiis elongatis; folia breviter petiolata subpapyracea, petiolo crassiusculo ca. 1.5 cm. longo; lamina oblongo-elliptica vel late elliptica 11–14 cm. longa 6–9 cm. lata abrupte breviter obtuso-acuminata, basi obtusa vel rotundata, integra, supra viridis lucida, costa nervisque vix elevatis, subtus fere concolor sublucida, costa prominente, nervis lateralibus utroque latere ca. 6 angulo lato adscendentibus arcuatis prominentibus, venulis prominulis laxe reticulatis; inflorescentiae axillares triflorae graciliter 3–6 cm. longe pedunculatae, bracteis foliaceis anguste oblongo-lanceolatis 1.5–2.5 cm. longis attenuato-acuminatis, pedicellis usque 7 mm. longis; calyx in alabastro clausus, extus prope basin sparse minute strigillosus, aliter glaber, ellipsoideus, 10–12 mm. longus, obscure costatus, breviter lobatus, lobis late ovatis apice breviter caudato-

apiculatis; corolla glabra hypocrateriformis, tubo 12 mm. longo tereti 2 mm. crasso, superne non dilatato, lobis patentibus oblongis obtusis tubo aequilongis.—La Peña de Zarcero, 1,650 meters, April, 1938, *Austin Smith H588* (type in Herb. Field Mus.). Los Angeles y La Paz de San Ramón, April, 1928, *Brenes 6147*. The type specimen is accompanied by the following notes: A scandent shrub in Caribbean cloud forest, at edge of woodland; bark light brown; leaves semirigid, moderately shining; flowers 4-parted; style with bilobed, curling stigmas; corolla very pale, greenish yellow when opening, fading to brown.

Clerodendron fragrans Vent. *Milflor, Verbena.* Planted commonly in gardens in the central region, and often thoroughly naturalized in waste places. Native of the Old World tropics. Plants suffrutescent, branched or simple, a meter high or less, very leafy; leaves long-petiolate, large, broadly ovate, cordate or truncate at the base, acute, coarsely dentate, pubescent; flowers large, white or pinkish, fragrant, in dense, terminal cymes, the corolla 2.5 cm. broad. The form found in Costa Rica is var. *pleniflora* Schauer, with double flowers.

Clerodendron Pittieri Moldenke, ined. Los Loros, Pacific coast, *Brenes 22048*. Also in Panama. A shrub with stiff branches, the stipule scars often conspicuously elevated and spinelike, the branches densely and minutely appressed-pubescent; leaves short-petiolate, oblong-obovate, 1–2 cm. long, obtuse or rounded at the apex, acute at the base, entire, glabrous, densely puncticulate beneath; flowers long-pedicellate, mostly solitary; calyx 3 mm. long, minutely puberulent or glabrate, truncate; corolla about 2 cm. long, with a long, slender tube.

Clerodendron Thomsonae Balfour. *Fucsia.* Often grown in gardens for ornament. Native of western tropical Africa. A slender vine, the branches puberulent; leaves short-petiolate, ovate-elliptic, abruptly acuminate, entire, glabrate; flowers showy, in terminal panicles; calyx white, 5-angulate, 1–1.5 cm. long, the broadly ovate lobes acuminate; corolla 2.5 cm. long, the limb crimson.

CONGEA Roxb.

Scandent shrubs; leaves opposite, entire; flowers in pedunculate, headlike cymes, these disposed in large, terminal panicles; bracts at the base of the cymes involucre-like, large and showy; calyx funnelform, 5-dentate; corolla tube slender, little exceeding the

calyx, the limb bilabiate; stamens 4, exserted; ovary incompletely 2-celled; fruit small, drupaceous, globose, almost dry.

Congea tomentosa Roxb. *Japonesa.* Planted for ornament about San José. Native of southeastern Asia. A large vine; leaves ovate, acute, about 7 cm. long, soft-pilose beneath; bracts large and conspicuous, oblong or oval, pink, densely and softly pubescent; corolla white.

CORNUTIA L.

Reference: Moldenke, A monograph of the genus *Cornutia*, Repert. Sp. Nov. 40: 153. 1936.

Shrubs or small trees with brittle branches, the branchlets quadrangular; leaves petiolate, large and broad, densely pubescent, entire; flowers small, blue or violet, in terminal, panicled cymes; calyx campanulate, with 4–5 short teeth; corolla tube cylindric, the limb bilabiate; perfect stamens two, 2 staminodia also present; ovary 4-celled, villous, the style with 2 short, unequal lobes; fruit small, drupaceous, globose, the stone 4-celled.—One or two additional species are known from Central America.

Cornutia grandifolia (Schlecht. & Cham.) Schauer. *Pavilla. C. pyramidata* var. *dentata* Kuntze, Rev. Gen. 2: 506. 1891 (type from Costa Rica, *Kuntze*). Frequent in thickets and forest of the central region, at 1,950 meters or less; region of San Ramón; Atlantic tierra caliente. Panama to Mexico. A shrub or tree of 3–9 meters, the trunk sometimes 45 cm. in diameter, the bark rugose and corky, creamy gray or pale brown, the branchlets densely villous-tomentose with spreading hairs; leaves long-petiolate, elliptic to broadly ovate, 10–30 cm. long, somewhat dentate or entire, densely short-villous beneath; panicles thyrsoid, 15–40 cm. long; calyx 1–1.5 mm. long; corolla bluish violet or purple, about 8 mm. long; fruit 3–4 mm. long, densely pilose. The tree is a showy and handsome one when decorated with the abundant, large panicles of bright-colored flowers.

Cornutia grandifolia var. **normalis** (Kuntze) Moldenke. *Murciélago.* Thickets of the tierra caliente. Panama. Differing from the typical form of the species in having the pubescence on the branches, leaves, and inflorescence much shorter and more appressed, the young flower buds being conspicuously hirsute with long, spreading hairs. Like other varieties assigned to this species, this appears to be a form of scant systematic importance.

Cornutia grandifolia var. **quadrangularis** (Oerst.) Moldenke ("Oerst. et Moldenke" in the original publication), Repert. Sp. Nov.

40: 168. 1936. *Pavilla. C. quadrangularis* Oerst. ex Moldenke, loc. cit. in syn. Near Cartago, *Oersted 11200*. Also in Guanacaste. Endemic. Differing from the typical form in having the nodes annulate with large, prominent, corky, shelflike projections; branches of the inflorescence usually more acutely tetragonal or even 4-alate.

Cornutia grandifolia var. **Storkii** Moldenke, Repert. Sp. Nov. 40: 169. 1936. Along roadside, Santa María de Dota, Prov. San José, 1,680 meters, *Stork 1743*. Known only from the region of the type; endemic. A shrub or tree of 7 meters or less; differing from the typical form in having a larger calyx, 2.5 mm. long.

Cornutia microcalycina Pavón. Differing from *C. grandifolia* in having the branches and the rachis of the inflorescence pilose, puberulent, or subglabrate rather than densely short-pubescent; perhaps only a variety of that species. The typical form ranges from Colombia to Peru. The species is represented in Costa Rica by the following variety:

Cornutia microcalycina var. **anomala** Moldenke. Cocos Island. Also in Panama. Differing from the species in having the pubescence of the leaves denser and of long, white, lustrous, multicellular hairs which are appressed on the upper surface and more or less matted beneath.

DURANTA L.

Shrubs or small trees, often armed with spines, the branches usually long and pendent or subscandent; leaves opposite or verticillate, entire or dentate; flowers small, in terminal or axillary racemes; calyx campanulate or tubular, truncate or 5-dentate; corolla funnelform or salverform, the cylindric tube straight or slightly curved, the limb oblique, 5-lobate; stamens 4, didynamous, included; ovary partially 8-celled, the stigma oblique, sometimes 4-lobate; drupe included in the calyx, containing 4 nutlets.—No other species are known from Central America.

Duranta costaricensis (Donn. Smith) Standl., sp. nov. *D. repens* var. *acuminata* Kuntze, Rev. Gen. 2: 507. 1891 (Turrialba, 900 meters, *Kuntze*). *D. Mutisii* L. var. *costaricensis* Donn. Smith, Bot. Gaz. 20: 9. 1895. La Estrella, Prov. Cartago, 1,320 meters, *Cooper 6007*. Occasional in thickets and forest of the central mountains, 900–1,400 meters or more. Panama. A shrub or small tree of 2–6 meters, the long and arching branches densely short-pilose,

armed with stout, straight, spreading spines; leaves short-petiolate, lanceolate or ovate-lanceolate, about 7 cm. long, narrowly long-acuminate, acute or obtuse at the base, entire, puberulent or glabrate above, densely villosulous beneath; calyx tube 6 mm. long, densely short-pilose, the narrow teeth long and slender; corolla about 1.5 cm. long, puberulent; the fruit pale yellow. The Costa Rican plant is apparently worthy of specific rank, and distinct from *D. Mutisii*, a species of the South American Andes.

Duranta repens L. *D. Plumieri* Jacq. Planted for ornament in gardens about San José and doubtless elsewhere. Widely distributed in tropical America, but probably not native in Costa Rica, unless along the Pacific coast. A shrub or small tree, the branches usually pendent, pubescent or glabrate, armed or unarmed; leaves slender-petiolate, broadly ovate-elliptic to oval or obovate, 2–5 cm. long, obtuse or acute, coarsely serrate or entire, glabrate; calyx 3–4 mm. long, the teeth minute; corolla lilac or sometimes white, puberulent, the limb 7–9 mm. wide; fruit globose, yellow, 7–11 mm. in diameter, enclosed in the accrescent, rostrate calyx.

HOLMSKIOLDIA Retz.

Shrubs with elongate, more or less clambering branches; leaves opposite, petiolate, entire or dentate; flowers racemose or cymose; calyx large, brightly colored, rotate; corolla cylindric, curved, the oblique limb with 5 short lobes; stamens 4, didynamous, exserted; fruit drupaceous, obovoid, 4-lobate.

Holmskioldia sanguinea Retz. *Sombrero chino.* Planted for ornament in gardens about San José. Native of southern Asia. A straggling shrub of 3–9 meters, pubescent or glabrate; leaves ovate, entire or dentate, conspicuously gland-dotted beneath, 5–8 cm. long; flowers in dense, terminal racemes; calyx red or orange, 2.5 cm. broad, entire; corolla brick-red or orange, 2–2.5 cm. long.

LANTANA L.

Shrubs, often armed with prickles, the pubescence mostly rough, the branchlets usually quadrangular; leaves opposite or verticillate, dentate; flowers small, capitate or spicate, bracteate; calyx campanulate, truncate; corolla salverform, the tube slender, often somewhat curved, the limb 4–5-lobate, somewhat asymmetric; stamens 4, didynamous, included; ovary 2-celled, the stigma oblique; fruit small, drupaceous, juicy, the nutlets 2-celled or separating into 2 one-seeded nutlets.—A few other species may be found in Central America.

Lantana Camara L. *Cinco negritos, Mora de caballo, Jarilla, Jaral, Soterré.* Common in thickets and hedges of the Meseta Central, and almost throughout the Pacific slope; not recorded from the Atlantic tierra caliente, but doubtless to be found there. Widely dispersed in tropical America, and introduced into the Old World tropics, where in some regions, as in Hawaii, it has become a noxious weed. A shrub of 1–2 meters, rough-pubescent throughout, armed with small, recurved prickles or unarmed; leaves broadly ovate to oblong-ovate, mostly 3–10 cm. long, obtuse to acuminate, rounded to acute at the base, coarsely crenate-serrate; flower heads not or scarcely elongating in fruit, the bracts lanceolate or oblong-lanceolate, green; corolla yellow or orange, changing to red; drupes black and shining. The plant is abundant in many places, especially in second-growth, and often is a troublesome weed in fields. It is somewhat variable in foliage and pubescence, also in color of the flowers. An infusion of the aromatic leaves is employed in domestic medicine as a stimulant and tonic. The heads of ripe fruits bear a striking resemblance to blackberries, an appearance that has suggested the local names of Cinco negritos and Mora de caballo. Forms of this species, often greatly modified by cultivation, are much grown for ornament in temperate regions; in the United States they are highly esteemed as bedding plants.

Lantana costaricensis Hayek, Repert. Sp. Nov. 2: 162. 1906. San José, 1,230 meters, in 1853, *Scherzer.* Known only from the original collection. Branches unarmed; leaves short-petiolate, ovate, cuspidate-acuminate, attenuate to the petiole, crenate-serrate, rough-setulose above, glandular beneath and sparsely pilose along the nerves; heads not elongating, the bracts ovate, acuminate, about equaling the corolla tube, setose, the outer ones hispidulous and as much as 1.5 cm. long, almost twice as long as the flowers; corolla 5–7 mm. long, puberulent and glandular-punctate. Of this species I have seen only a leaf, from the type. It is closely related to *L. hispida,* to judge from the description, and may be distinct.

Lantana hispida HBK. *Soterré blanco, Jaral, Mora de caballo.* Common in thickets and hedges of the central region, at middle elevations; region of San Ramón. Extending to Mexico. A shrub of 1–2 meters, unarmed; leaves ovate-oblong to ovate or elliptic, 3–9 cm. long, acute or acuminate, acute or obtuse at the base, crenate, scabrous above, hispidulous-strigose beneath along the nerves; peduncles equaling or shorter than the leaves, the heads not elongat-

ing in fruit or scarcely so; bracts ovate to lanceolate, large, green; corolla white, purple, or lilac; fruit black.

Lantana trifolia L. Frequent in thickets of the tierra caliente, also in hedges and thickets about San José. Widely distributed in tropical America. A low shrub; leaves mostly ternate (opposite in other species listed here), lanceolate to ovate, acute to long-acuminate, contracted and decurrent at the base, scabrous above, rather softly puberulent beneath, crenate-serrate; flowers spicate, the spikes elongate, at least in fruit, often equaling or exceeding the leaves, the bracts mostly lanceolate or lance-ovate, green; corolla lilac or purple; fruit purple. The fruits of this and other species often are eaten by children.

LIPPIA L.

Shrubs, trees, or perennial herbs; leaves opposite, usually dentate; flowers small, mostly white, bracteate, spicate or capitate; calyx small, ovoid, campanulate, or sometimes compressed and somewhat 2-alate, 2–4-dentate; corolla salverform, the limb somewhat oblique and bilabiate, 4-lobate; stamens 4, didynamous; ovary 2-celled, the style short, the stigma oblique or recurved; fruit drupaceous but dry, finally separating into 2 nutlets.—Other species are found in Central America.

Lippia alba (Mill.) N. E. Brown. *Juanilama.* Thickets of the Pacific tierra caliente, ascending to the region of San José; Guanacaste; sometimes cultivated, probably for medicinal purposes. Widely distributed in tropical America. An aromatic shrub, a meter high or less, with slender branches; leaves petiolate, ovate to oblong, 2–7 cm. long, acute or obtuse, acute at the base, crenate, densely short-pilose, rough on the upper surface; peduncles usually 2 at each node, shorter than the leaves, the heads globose or short-oblong, about 8 mm. thick, the bracts ovate, acute, not accrescent; calyx 2-dentate; corolla purple or white, the tube 4–5 mm. long. The plant finds various uses in domestic medicine.

Lippia Berlandieri Schauer. *Orégano.* Cultivated frequently in gardens. Native of Mexico, and perhaps ranging more widely. A slender shrub, usually a meter high or less, the branches short-pilose; leaves petiolate, oblong to ovate or oval, mostly 1.5–3.5 cm. long, obtuse or usually rounded at the apex, rounded at the base, crenate, densely pubescent, especially beneath; heads oblong, 4–12 mm. long, slender-pedicellate, usually 4 or more at each node, the

bracts conspicuously 4-seriate; corolla white. The aromatic leaves are used in Costa Rica for flavoring food, also medicinally.

Lippia Brenesii Standl., sp. nov.—Frutex vel arbuscula 1–5-metralis ut videtur dense ramosa, ramulis gracilibus sat dense pilis brevibus albidis strigosis, internodiis brevibus vel elongatis; folia inter minora graciliter petiolata subcoriacea, petiolo 5–14 mm. longo strigilloso-scabro; lamina late elliptica usque ovata, interdum oblongo-ovata, 3–6.5 cm. longa 1.5–4 cm. lata breviter acuminata usque obtusa, basi cuneato-acuta vel attenuata et saepe contracto-decurrens, arcte serrata vel crenato-serrata, supra scabra dense albo-punctata, saepe propter nervos impressos subbullata, subtus scabra asperrima, costa nervisque valde prominentibus, nervis lateralibus utroque latere ca. 6; flores capitati, capitulis ad nodum 2–6, pedunculis gracilibus 1–2.5 cm. longis strigilloso-scaberulis; capitula in statu fructifero vix elongata globosa 8–10 mm. lata, bracteis viridibus late ovatis acutis vel subacuminatis scabris vel glabratis usque 6 mm. longis in statu fructifero vix auctis; calyx compressus bidentatus vix ultra 1 mm. longus dense albido-pilosulus; corolla alba ca. 3 mm. longa, tubo gracili extus glabro, limbo 1.5 mm. lato, lobis late rotundatis extus dense puberulis intus sparsius puberulis.—Santiago de San Ramón, camino de San Gerardo, December, 1928, *Brenes 6477* (type in Herb. Field Mus.). Volcán de Turrialba, 1,200 meters, *Pittier 7519*. Caminos entre la carretera Alajuela-Grecia y el Tajo del Río Rosales, *Brenes 17509*. Piedades Sur (Quebrada Honda) por La Palma de San Ramón, *Brenes 5855*. Hills of Nicoya, *Tonduz 13631*. Between Aserrí and Tarbaca, 1,200–1,700 meters, *Standley 41349*. Piedades de San Ramón, 1,000 meters, *Brenes 4756*. Camino en los alrededores de Heredia, parte noroeste, 1,100 meters, *Brenes 13238*. Tablazo, 1,800 meters, *M. Valerio 1521*. Material of this plant has been referred previously to *L. myriocephala* Schlecht. & Cham., from which it is amply distinct, and to *L. asperifolia* Rich.

Lippia dulcis Trevir. *Orozuz.* Common in fields and waste places, tierra caliente and Meseta Central, at 1,500 meters or less. Mexico to West Indies and Colombia. Plants herbaceous and procumbent, or sometimes erect and suffrutescent, usually 30 cm. high or less; leaves long-petiolate, oblong-ovate to broadly ovate, mostly 2–4 cm. long, acute or obtuse, coarsely crenate; flower heads solitary in the leaf axils, long-pedunculate, about 6 mm. in diameter, elongating in age, the flowers white. The plant is decidedly aromatic. A tea made from it is a popular local remedy for coughs and colds.

Lippia myriocephala Schlecht. & Cham. Thickets about San José; region of Tilarán, Guanacaste. Ranging to Mexico. A shrub or tree, sometimes 9 meters high; leaves short-petiolate, lanceolate or lance-oblong, 6–18 cm. long, usually long-acuminate, acute to attenuate at the base, scaberulous or smooth above, sparsely and rather softly puberulent beneath or glabrate, sometimes tomentose, finely serrate or entire; heads usually numerous at each node, globose or somewhat elongate, 5–7 mm. thick, the peduncles long and slender, the bracts not or scarcely accrescent in age; corolla white or lilac. A good many Costa Rican collections have been referred to this Mexican species, but I have seen only two that seemed properly referable here, and those I am unable to distinguish from the typical form. It may be, however, that careful study will show that the collections I have placed here are properly referable elsewhere.

Lippia nodiflora (L.) Michx. Reported from the Atlantic coast, growing on or near beaches. Widely distributed in tropical and subtropical regions of both hemispheres. Plants perennial, herbaceous, prostrate and rooting at the nodes; leaves petiolate, rather thick, spatulate to oblanceolate or obovate, 1–5 cm. long, usually obtuse, cuneate at the base, serrate above the middle, minutely pubescent or glabrate; peduncles usually longer than the leaves, the heads at first globose, elongate and cylindric in age, 1–2.5 cm. long; corolla purple or white, little longer than the bracts.

Lippia oxyphyllaria (Donn. Smith) Standl., sp. nov. *Caragra. L. substrigosa* Turcz. var. *oxyphyllaria* Donn. Smith, Bot. Gaz. 23: 249. 1897. Térraba, Prov. Puntarenas, 240 meters, *Pittier 3951*. Collected also at Buenos Aires, 300 meters. Endemic. A shrub or small tree, the branches densely pilose; leaves petiolate, oblong-elliptic or lance-oblong, mostly 6–9 cm. long, acute or acuminate, cuneate at the base, often contracted and decurrent, closely crenate, rather thick, rugose, densely short-pilose above, asperulous, more densely and softly pilose beneath, the nerves and veins very prominent; heads usually 2 in each axil, subglobose, 2.5 cm. wide, the peduncles long and recurved, the bracts large, broadly ovate, accrescent in age. It is probable that most of the material reported from Costa Rica as *L. umbellata* Cav. is referable to this endemic species, which is distinguished from other local species by the broad heads with accrescent bracts.

Lippia Torresii Standl., sp. nov.—*Caragre.* Arbor 4–12-metralis, ramulis novellis acute angulatis dense breviter pilis sordidis

hispidulis; folia majuscula petiolata membranacea, petiolo gracili 1.5–2.5 cm. longo dense hispidulo; lamina ovato-oblonga plerumque 12–21 cm. longa atque 6–9 cm. lata acuta vel subacuminata, basi subabrupte cuneato-attenuata, supra sparse villosula tactu mollis, plus minusve ob venulas arcte reticulatas bullata, subtus multo pallidior ubique dense pilis rectis patentibus sed plus minusve intertextis velutino-pilosa, costa gracili elevata, nervis lateralibus utroque latere ca. 10 arcuatis angulo latiusculo adscendentibus, toto margine arcte crenulato; flores dense capitati, capitulis in statu fructifero globosis 1 cm. diam., pedunculis axillaribus fasciculatis gracillimis ca. 1.5 cm. longis dense hispidulis; bracteae pallido-virides ut videtur in statu fructifero accrescentes membranaceae venosae ciliolatae fere glabrae apice late rotundatae; calyx fere 2 mm. longus dense villosulus; corolla viridi-alba extus fere omnino glabra sed ad lobos puberula, tubo gracili 2 mm. longo, lobis latis 1 mm. longis.—Tapezco de Zarcero, 1,950 meters, March, 1938, *Austin Smith H436* (type in Herb. Field Mus.). Zarcero, 1,350 meters, *Smith H187, 4183*. Wet forest, Viento Fresco, Prov. Alajuela, 1,600–1,900 meters, February, 1926, *Paul C. Standley & Rubén Torres Rojas 47937*. Near El Copey, Prov. San José, 2,300 meters, December, 1925, *Standley 43519*. Available material is rather ample, showing that the plant represented is clearly a species distinct from all others enumerated here. The large leaves, with finely crenate margins, are noteworthy for the very dense, velvety or almost tomentose indument of the lower surface. Regarding this species, Austin Smith's notes give the following information: Growing in the open along roadways or in forest; trunk 15–35 cm. in diameter, the bark dark brown to neutral gray, roughened and with moderate striations; cambium layer greenish; leaves aromatic; flowers chrome yellow.

PETREA L.

Reference: Moldenke, A monograph of the genus *Petrea*, Repert. Sp. Nov. 43: 1. 1938.

Usually scandent shrubs, glabrous or with rough pubescence; leaves opposite, coriaceous, entire; flowers in elongate, terminal or axillary racemes; calyx tube turbinate, 5–15-costate, the 5 lobes oblong, spreading, bright-colored, greatly enlarged after anthesis; corolla tube short, cylindric, the limb oblique, 5-lobate; stamens 4, didynamous, included; ovary imperfectly 2-celled, the stigma thick, usually oblique, didymous; fruit included in the calyx, dry or nearly so, 2-seeded or by abortion 1-celled and 1-seeded.—One other Central American species occurs in Panama.

Petrea volubilis L. *Choreque.* Frequent in thickets and dry forests of the Pacific tierra caliente; Guanacaste; region of San Ramón; sometimes cultivated for ornament about San José. Widely distributed in tropical America. A large, woody vine; leaves short-petiolate, elliptic-oblong to elliptic-oval or obovate-oblong, 5–14 cm. long, obtuse or acute, often subcordate at the base, scaberulous or somewhat pilose or sometimes glabrate; flowers bright blue, in long, pendent racemes; calyx lobes oblong or linear-oblong, in fruiting state 1.5–2 cm. long, obtuse or acute; corolla about 1 cm. long. In Florida, where the vine is sometimes grown for ornament, it is known by the name Purple wreath. It is exceptionally handsome when in flower, the pendent racemes being somewhat suggestive of the wistaria. A white-flowered form, **P. volubilis** f. **albiflora** Standl., comb. nov. (*P. arborea* f. *albiflora* Standl. Field Mus. Bot. 11: 140. 1932; *P. volubilis* var. *albiflora* Moldenke, Rev. Sudamer. Bot. 5: 2. 1937), has been collected in British Honduras, and may be expected in Costa Rica. In passing, it may be remarked that most botanists agree in according the status of form rather than variety to casual color forms. All or most Central American material previously referred to *P. arborea* HBK. is really *P. volubilis* L.

PRIVA Adans.

Reference: Moldenke, Repert. Sp. Nov. 41: 1. 1936.

Perennial herbs with harsh pubescence; leaves opposite, thin, sessile or petiolate, dentate; inflorescence racemose, terminal or axillary, the flowers small; calyx tubular, 5-costate, with 5 short teeth, accrescent in age and closely investing the fruit, contracted at the apex; corolla salverform or funnelform, somewhat zygomorphic, the tube straight or somewhat curved, the limb somewhat bilabiate; stamens 4, didynamous, included; ovary 4-celled or by abortion 2-celled, the stigma bilobate; fruit dry, composed of two 2-celled cocci, which separate easily at maturity.—One other species is known from Central America.

Priva aspera HBK. *Churrite.* A weed in waste places of the tierra caliente, ascending to the Meseta Central. Ranging to Mexico. An herb, usually erect, a meter high or less, the stems acutely quadrangular, short-pilose; leaves slender-petiolate, ovate to oval, mostly 6–10 cm. long, acute or acuminate, obtuse or acute at the base, crenate-serrate, scabrous above, short-pilose beneath; racemes 7.5–30 cm. long, many-flowered, the pedicels 1–2 mm. long; calyx 4.5 mm. long; corolla pink to purple, almost 1 cm. long; cocci of the fruit 3 mm. long, subglobose, the inner surface deeply excavate.

Priva lappulacea (L.) Pers. Waste places of the Atlantic tierra caliente, and perhaps elsewhere. Widely distributed in tropical America. Similar to the preceding species, but the stems rather obtusely angulate and rather more slender; leaves ovate, subtruncate or subcordate at the base, coarsely crenate; racemes mostly shorter; calyx 2–3 mm. long in anthesis; corolla somewhat shorter, blue; cocci flat on the inner surface, not excavate. Called Mozotillo in Nicaragua. The pubescence of the plant consists in part of small, uncinate hairs, by means of which the leaves and calyces adhere closely to clothing and other objects. Forms with white corollas are found occasionally. This and the preceding are common dooryard and roadside weeds in many parts of tropical America.

REHDERA Moldenke

Reference: Moldenke, A monograph of the genus *Rehdera*, Repert. Sp. Nov. 39: 47. 1935.

Shrubs or small trees; leaves opposite, triplinerved, petiolate, entire; inflorescence racemose, short, nutant; calyx tubular, indurate, splitting in age and sometimes deciduous; corolla salverform, regular, the tube as long as the calyx, the limb 5-lobate; stamens 4, didynamous; style glabrous, the stigma somewhat bilobate; ovary 2-carpellate, 4-celled; fruit drupaceous, obovoid-oblong.—Two other species are known in the genus, both Guatemalan.

Rehdera trinervis (Blake) Moldenke. *Citharexylum trinerve* Blake; *C. macrocarpum* Standl. Forests or thickets of Nicoya. Extending to Salvador and Yucatan. A tree of 10 meters or less, with rounded crown, the branchlets glabrate or puberulent; leaves slender-petiolate, coriaceous, broadly elliptic or obovate, 2–9 cm. long, acute to rounded at the apex, acute at the base, glabrous or nearly so, conspicuously triplinerved; racemes simple, 2–4 cm. long, the rachis puberulent, the pedicels 1 mm. long or less; calyx 5 mm. long, glabrous; corolla tube 4.5–5 mm. long, the lobes of equal length, pubescent within; fruit 8 mm. long and 6 mm. wide, almost dry, glabrous, splitting at maturity into 2 cocci.

STACHYTARPHETA Vahl

Annual or perennial herbs or low shrubs; leaves mostly opposite, dentate; flowers spicate, solitary and sessile in the axils of bracts or sunken in furrows in the rachis; calyx 5-lobate; corolla tube cylindric or somewhat dilated above, the limb spreading, 5-lobate; stamens 2, included; ovary 2-celled, with 1 ovule in each cell; fruit included in

the calyx, dry, separating at maturity into 2 nutlets.—Two or three other species are known from Central America.

Stachytarpheta cayennensis (L. Rich.) Vahl. Thickets and waste places of the Pacific slope, ascending to 1,800 meters. Widely distributed in tropical America. Plants herbaceous or somewhat frutescent, usually a meter high or less, slender, branched, the branches pilose or glabrate; leaves slender-petiolate, broadly ovate to elliptic, 3–7 cm. long, obtuse or acute, obtuse to cuneate at the base and decurrent, coarsely serrate or crenate, more or less pilose on both surfaces, usually rough above; spikes 25 cm. long or less, slender, the furrows almost as broad as the rachis; corolla blue, rarely white, the limb about 5 mm. broad.

Stachytarpheta Frantzii Polak. Linnaea 41: 593. 1877. Roadsides near Barba, *Polakowsky 343* (photo. of type seen, ex herb. Berlin). Occasional in thickets, hedges, and waste places of the Meseta Central, and in the upper part of the Atlantic tierra caliente, chiefly at 750–1,200 meters. Endemic. Plants stout, much branched, often woody, 2.5 meters high or less, the branches densely pilose; leaves petiolate, 10 cm. long or less, oval to ovate, obtuse or acute, abruptly contracted and decurrent at the base, coarsely serrate, pilose and scabrous above, densely pilose beneath or tomentose; spikes 30 cm. long or less, very stout, the rachis much broader than the furrows; corolla purple, the slender tube 1.5 cm. long. Material of this species has been referred to *S. mutabilis* (Jacq.) Vahl, to which the plant is related, if, indeed, it is distinct.

Stachytarpheta jamaicensis (L.) Vahl. Thickets of the Atlantic tierra caliente, often growing on sea beaches; also on the Pacific slope, at middle or low elevations; Guanacaste. Widely distributed in tropical regions of both hemispheres. Plants stout, herbaceous, a meter high or less, the stems glabrous or sparsely and inconspicuously pilose; leaves slender-petiolate, oblong to ovate or oval, 3–8 cm. long, very obtuse, narrowed at the base, crenate, glabrous or nearly so; spikes stout, 10–25 cm. long, almost glabrous, the rachis much broader than the furrows; corolla blue, about 1 cm. long, the limb 8 mm. broad.

VERBENA L.

Reference: Lily M. Perry, A revision of the North American species of *Verbena*, Ann. Mo. Bot. Gard. 20: 239–362. 1933.

Mostly herbs, the leaves opposite, often deeply lobate or parted; flowers bracteate, often large and showy, in terminal spikes; calyx

tubular, 5-angulate, 5-dentate; corolla commonly salverform, the limb spreading, regular or nearly so; ovary 4-celled, the style bilobate; fruit dry, enclosed in the calyx, finally separating into four 1-seeded, linear or oblong nutlets.—One or two additional species occur in Central America.

Verbena litoralis HBK. *Verbena.* Frequent in waste places, often in cultivated fields, tierra caliente, ascending to the Meseta Central, mostly at 1,300 meters or less, but sometimes at somewhat higher elevations. Widely distributed in tropical America. Plants erect, a meter high or less, the stems quadrangular, glabrous or sparsely strigillose, slender; leaves slender-petiolate to subsessile, lanceolate to oblong, attenuate to the base, coarsely serrate, sparsely strigillose, scabrous above; spikes very slender, dense or interrupted; calyx 2–2.5 mm. long; corolla small, purple, the limb 2.5–3 mm. wide; nutlets scarcely 2 mm. long. The plant is employed in domestic medicine as a remedy for fevers.

Verbena teucrioides Gill. & Hook. *Verbena.* Cultivated commonly in gardens as an ornamental plant. Native of southern South America. The common garden verbena, with flowers ranging from white to pink, red, or purple, is a favorite garden flower of Central America, especially in the temperate regions. The proper specific name of the garden plants, which may be in part of hybrid origin, is somewhat uncertain.

LABIATAE. Mint Family

Herbs, shrubs, or small trees, mostly aromatic, the stems usually quadrangular; leaves opposite, simple, entire or dentate; stipules none; flowers perfect, usually irregular, variously arranged; calyx inferior, persistent, 5-dentate or 5-lobate, usually bilabiate but sometimes regular, the upper lip bilobate or entire, the lower lip commonly 3-lobate; stamens borne on the corolla tube, typically 4 and didynamous, sometimes 2, the filaments alternate with the corolla lobes, the anthers normally 2-celled; ovary 4-lobate or 4-parted, superior, each division 1-ovulate; style arising from the center of the ovary, bilobate at the apex; fruit of four 1-seeded nutlets.—A few other genera are represented in Central America.

COLEUS Lour.

Rather succulent herbs, the leaves broad, dentate or incised; flowers small, blue or lilac, verticillate in terminal spikes or racemes; calyx campanulate, 5-dentate; corolla bilabiate, the lower lip

elongate, concave, entire; stamens 4, declined, the anthers 1-celled; nutlets smooth.—No species of this genus are native in America.

Coleus amboinicus Lour. Grown commonly in gardens as an ornamental plant. Native of southeastern Asia. Plants sometimes suffrutescent; leaves broadly deltoid-ovate, crenate, pilose-tomentose, at least beneath; flowers almost sessile, on very short pedicels.

Coleus Blumei Benth. A common garden plant. Native of the East Indies. Plants herbaceous, puberulent or glabrate; leaves highly variable in shape and color, often variegated, dentate or incised; flowers on pedicels 1.5–2.5 mm. long.

CUNILA L.

Herbs or shrubs; leaves usually small, serrate or entire, membranaceous; flowers small, in dense or lax verticels, these axillary or in terminal racemes or cymes; calyx tubular, 10–13-nerved, densely white-barbate in the throat, the 5 teeth subequal; corolla small, bilabiate; stamens 2.—No other species are known from Central America.

Cunila polyantha Benth. Region of Santa María de Dota, 1,500–1,800 meters, in thickets. Ranging to southern Mexico. Plants very slender, densely branched, herbaceous or somewhat woody, often somewhat scandent and 3 meters long, the branches villosulous; leaves narrowly lanceolate to broadly ovate, 2–5 cm. long, acute to long-acuminate, entire or serrulate, almost sessile, thinly tomentose or glabrate beneath, almost glabrous above; corolla white, 4 mm. long, almost twice as long as the calyx; stamens long-exserted. The leaves have the odor of American pennyroyal (*Hedeoma*).

HYPTIS Jacq.

Reference: Epling, Synopsis of the genus *Hyptis* in North America, Repert. Sp. Nov. 34: 73. 1933.

Herbs or shrubs, usually erect and branched, the leaves mostly dentate, the flowers variously disposed; calyx tubular to campanulate, equally 5-dentate, the teeth acute or aristate; corolla bilabiate, the upper lip erect or spreading, the lower saccate and pendent; stamens 4, declined, the anthers 2-celled; nutlets smooth or rough. —A few other species are known from Central America.

Hyptis brachiata Briq. Savannas and other grassy places, Pacific tierra caliente. Extending to Colombia and Venezuela.

Plants stout, erect, usually a meter high or less, simple or sparsely branched, the stems densely tomentose; petioles only 3–5 mm. long; leaf blades ovate, 4–6 cm. long, thick, obtuse, rounded at the base, serrate-crenate, villous above, densely ferruginous-tomentose beneath; flowers capitate, the heads 2 cm. or less in diameter, on stout peduncles 2 cm. long or less, the bracts ovate-lanceolate, 6–8 mm. long; calyx in anthesis 5–6 mm. long, the teeth setaceous, equaling the tube; corolla tube 5–6 mm. long.

Hyptis brevipes Poit. Region of San Ramón, at about 1,000 meters, and elsewhere on the Pacific slope. Widely distributed in tropical America. A slender annual, 60 cm. high or less, branched, the stems appressed-hirsute; leaves petiolate or sessile, mostly elliptic-lanceolate and 4–6 cm. long, acute, long-attenuate to the base, serrate, villous-hirsute; flowers capitate, the heads 1 cm. or slightly more in diameter, the peduncles only 3–15 mm. long, the bracts narrowly lanceolate, villous-ciliate, 4–6 mm. long; calyx tube 2.5–3 mm. long, the teeth setaceous, 1.5–2.5 mm. long; corolla white, the tube 2.5–3 mm. long.

Hyptis capitata Jacq. *Churrite, Coquita, Biojo.* Frequent in thickets or waste places about the Meseta Central, and in the Atlantic tierra caliente; region of San Ramón; Cocos Island. Widely distributed in tropical America. A coarse, annual or perennial herb, 1–2 meters high, or often lower, the stems sparsely villous with spreading or subappressed hairs or almost glabrous; leaves petiolate, thin, ovate or broadly ovate, 5–12 cm. long or larger, acute or obtuse, cuneate-attenuate to the base, serrate, sparsely pilose or glabrate; flowers capitate, the heads 2–2.5 cm. in diameter, long-pedunculate; bracts ovate-lanceolate; calyx tube in fruit about 1 cm. long, glabrous or nearly so, the teeth subulate; corolla white, the tube 3–4 mm. long. The plant is a common weed about dwellings and in waste places generally. All or most of the Costa Rican material would be placed, according to Epling's treatment, in *H. decurrens* (Blanco) Epling, which does not seem to the present writer to be definitely separable from *H. capitata*, of which it may represent a variety. As indigenous Indian names Pittier reports Surém-krá (Brunka) and Kun-guó and Kung-uá (Térraba).

Hyptis conferta Pohl var. **angustifolia** Benth. *H. constricta* Briq. Ann. Cons. Jard. Genève 2: 217. 1898 (near Turrialba, *Pittier 3719*). Savannas or other grassy places of the Pacific tierra caliente. Widely distributed in tropical America. A branched, perennial herb

60 cm. high or less, the stems glabrous to hirsute; leaves subsessile; narrowly elliptic, 6–10 cm. long, acutish at each end, pubescent or hirsute, sometimes almost glabrous; flowers capitate, the heads 2 cm. in diameter, on villous peduncles 1–3 cm. long; bracts ovate-lanceolate, cinereous-pubescent, 7–8 mm. long; calyx tube at anthesis 2–2.5 mm. long, the teeth subulate, the tube in fruit 5–6 mm. long; corolla white, the tube 4–5.5 mm. long.

Hyptis lantanaefolia Poit. *H. lantanaefolia* var. *costaricensis* Briq. Ann. Cons. Jard. Bot. Genève 2: 222. 1898 (savannas at Buenos Aires, *Pittier 3716*). Savannas and other grassy places of the Pacific tierra caliente, also in the region of San Ramón, ascending to 1,200 meters; Las Cóncavas, south of Cartago. Widely distributed in tropical America. A branched perennial, the stems mostly decumbent and sometimes rooting at the lower nodes, appressed-hirsute or villous; leaves subsessile, ovate to elliptic, 1.5–5 cm. long, obtuse at each end, sometimes subcuneate at the base, crenate-serrate, hirtellous or hirsute above, often pale beneath and hirsute-villous; flowers capitate, the heads 12–20 mm. in diameter, the bracts ovate or obovate, 5–8 mm. long, often serrate, hirsute, the peduncles 2–7 cm. long; calyx tube at anthesis 1.5–2.5 mm. long, in age 4–5 mm. long, pilose outside at the base, the teeth subulate, 1.5–3.5 mm. long; corolla pink or white, the tube 4 mm. long.

Hyptis Mociniana Benth. *Asterohyptis Mociniana* Epling; *H. alopecuroides* Briq. Ann. Cons. Jard. Genève 2: 201. 1898 (near San Mateo, *Biolley 7099*); *H. Biolleyi* Briq. Ann. Cons. Jard. Genève 2: 200. 1898 (between San Mateo and San Ramón, *Biolley 7010*). Pacific slope, at 1,000 meters or less; region of San Ramón; Guanacaste. Extending to Mexico. A slender shrub, 1–2.5 meters high, the branches brownish, villous-hirsute; leaves petiolate to subsessile, ovate, mostly 2–4 cm. long, acuminate, obtuse to subcordate at the base, serrate, tomentulose beneath; flowers sessile in dense clusters, these arranged in long, narrow, panicled spikes; calyx small, densely hirtellous, the teeth slender, stiff, spinose, spreading in fruit; corolla white. Easily recognized by the shrubby habit and the stiff, spinelike, spreading calyx teeth.

Hyptis mutabilis (A. Rich.) Briq. *Churrite, Chan.* Common in fields and thickets of the Meseta Central, and at lower elevations on the Pacific slope, probably descending to the coast; region of San Ramón. Widely distributed in tropical America. A branched herb, usually 1.5 meters high or less, the branches glabrous to villous;

leaves petiolate, thin, ovate or rhombic-ovate, mostly 3–6 cm. long, acute or acuminate, rounded and abruptly decurrent or cuneate at the base, crenate-serrate, hirtellous to tomentose beneath or rarely glabrate; flowers in dense, bracteate clusters, these arranged in dense spikes, the bracts elliptic-ovate, acuminate; calyx tube in flower 1.5–2 mm. long, in fruit 4 mm. long, villosulous near the base, the teeth setaceous, 1 mm. long; corolla purple, the tube 3–4 mm. long. The plant is an abundant weed in many places about the Meseta Central, often forming dense thickets.

Hyptis oblongifolia Benth. is reported by Epling from Costa Rica, but the single specimen cited (from Volcán El Viejo) is actually Nicaraguan. The species is found also in Panama, and is to be expected, therefore, in Costa Rica.

Hyptis pectinata Poit. Thickets, fields, and hedges, Meseta Central and region of San Ramón, mostly at 1,000–1,200 meters; perhaps also at lower elevations. Widely distributed in tropical America. A much branched herb, usually 1–2 meters high, the branches scaberulous or pubescent; leaves slender-petiolate, mostly ovate and 2–7 cm. long, acute or acuminate, rounded or subcordate at the base, crenate-serrate, puberulent to tomentose beneath; flowers in small, very dense, headlike cymes, these racemose or spicate, on peduncles scarcely more than 2 mm. long, the bracts linear-setaceous; calyx tube at anthesis 1 mm. long, the teeth setaceous, of about the same length; corolla white. A common weed in many localities.

Hyptis obtusiflora Presl. Waste places of the Atlantic tierra caliente; region of San Ramón. Ranging to Bolivia. Plants herbaceous or suffrutescent, a meter high or less, the stems appressed-pilose; leaves short-petiolate, oblong-lanceolate to oblong-ovate, mostly 3.5–6 cm. long, acute at each end, serrate, sparsely villous-pilose on both surfaces; flowers capitate, the heads globose, 1 cm. or less in diameter, on stout peduncles shorter than the heads; calyx very small, the short teeth triangular; corolla white.

Hyptis pulegioides Pohl. Collected near San José and in the region of El General. Widely distributed in tropical America. Plants annual, simple or branched, the stems appressed-hirsute; leaves short-petiolate or subsessile, elliptic-lanceolate, 3–8 cm. long, acute, cuneate-attenuate to the base, serrate, hirsute; flowers capitate, the heads globose, 1 cm. in diameter, the bracts linear, the

peduncles 1 cm. long or less, often none; calyx in flower 2.5 mm. long; corolla tube 2 mm. long.

Hyptis recurvata Poit. Pacific slope, at 1,200 meters or less; region of San Ramón. Widely distributed in tropical America. Plants annual or perennial, herbaceous, a meter high or less, branched, the stems villous; leaves slender-petiolate, ovate or broadly ovate, 3–9 cm. long, acute, rounded and often cordate at the base, irregularly serrate, hirsute on both surfaces; flowers capitate, the heads globose, 1 cm. in diameter, on peduncles 2–4 cm. long, the bracts linear-setaceous; calyx in flower 3 mm. long, hispidulous, the teeth equaling the tube, setaceous; corolla white, the tube 5 mm. long.

Hyptis savannarum Briq. Ann. Cons. Jard. Bot. Genève 2: 216. 1898. Savannas near Boruca, *Pittier 4511*. Collected also at Cañas Gordas and in the region of Cartago. Panama to Salvador. Plants perennial, usually a meter high or less, the stems glabrous; leaves short-petiolate or sessile, elliptic-lanceolate or elliptic, 6–12 cm. long, acute, cuneate-attenuate to the base, coriaceous, acutely serrate, almost glabrous; flowers capitate, the heads globose, in age 2–3 cm. in diameter, the bracts 8–15 mm. long, ovate-lanceolate, glabrous, acute, the peduncles mostly 3–7 cm. long; calyx tube in anthesis 3.5 mm. long, in age 7–8 mm. long, glabrous or nearly so, the teeth acicular, 3–5 mm. long; corolla tube 6–7 mm. long.

Hyptis sidaefolia Briq. Reported by Epling from Río Tilirí near San José, *Tonduz 3143*. Guatemala to Venezuela and Peru. Plants erect, branched, the stems pilose-villous; leaves petiolate, ovate, 3–5 cm. long, acute, rounded at the base, irregularly serrate, soft-hirsute above, short-villosulous and pale beneath; flowers in headlike cymules, these on peduncles 2–3 cm. long, about 1 cm. in diameter, arranged in leafy panicles, the bracts linear-subulate; calyx in flower 2.5 mm. long, the teeth subulate, 1 mm. long; corolla pale purple, the tube 4 mm. long. I have not seen the Costa Rican specimen reported by Epling. The species, however, is very close to *H. urticoides*, and it seems probable, since only a single specimen referable to this species has been found among all the material collected about San José, that the number listed as *H. sidaefolia* is nothing more than *H. urticoides*.

Hyptis sinuata Pohl. Region of Boruca, 450 meters. *H. sinuata* var. *borucensis* Briq. Ann. Cons. Jard. Bot. Genève 2: 228. 1898 (near Boruca, *Pittier 3746*). Widely distributed in tropical America. An erect, branched herb, a meter high or less, the branches

villous; leaves petiolate, broadly ovate, mostly 6–8 cm. long, subacute, truncate and abruptly decurrent at the base, crenate, hirsute-villous, especially beneath; flowers capitate, the heads 1.5–2 cm. in diameter, the bracts linear-lanceolate, 10–12 mm. long, ciliate, the peduncles villous, 1–3 cm. long; calyx tube in anthesis 2–2.5 mm. long, in age 4–7 mm. long, glabrous, the teeth subulate, 1–1.5 mm. long, hispid-villous; corolla white, the tube 4.5–6 mm. long.

Hyptis suaveolens (L.) Poit. *Chián, Chan.* Frequent in waste places or thickets of the Pacific tierra caliente; Guanacaste; region of San Ramón. Widely distributed in tropical America. Plants coarse and stout, essentially annual, branched, 1.5 meters high or less, the stems glandular-villous and hirsute; leaves long-petiolate, ovate, 4–10 cm. long, usually acute, rounded or subcordate at the base, serrate, villosulous or hirsute; flowers in small, dense cymules, these mostly solitary in the upper axils, or subspicate; calyx in flower 4–5 mm. long, the tube in fruit 5–7 mm. long, villous or hirsute, the teeth long, subulate, rigid; corolla bluish or purple, the tube 4–6 mm. long. The seeds, which exude mucilage when soaked in water, are often employed for preparing a refreshing beverage. The aromatic, dried foliage is sometimes placed in rooms to keep away mosquitoes. Pittier reports the Térraba name of Tshián-ko.

Hyptis urticoides HBK. Frequent in thickets and fields of the Meseta Central, and on the upper part of the Pacific slope, mostly at 1,000–1,800 meters; region of San Ramón. Extending to southern Mexico. Plants rather slender, erect, branched, 1–2 meters high, herbaceous, the branches crisp-pubescent and pilose; leaves thin, slender-petiolate, ovate or ovate-lanceolate, 3–8 cm. long, obtuse or acute, rounded at the base, serrate, hirtellous above, villous or tomentose beneath and often pale; flowers in dense, headlike cymules on slender peduncles 1–2.5 cm. long, forming large, leafy panicles, the bracts linear or filiform; calyx in flower 2.5–3 mm. long, villous, the teeth subulate, equaling the tube, the teeth somewhat unequal, in fruit as much as 2 mm. long; corolla pale purple, the tube 3.5–4 mm. long.

Hyptis verticillata Jacq. *Juanilama mocha, Canilla de mula.* Frequent in thickets of the tierra caliente; Guanacaste. Widely distributed in tropical America. A slender, densely branched shrub, usually 2.5 meters high or less, the branches appressed-pilosulous; leaves short-petiolate, lanceolate or oblong-lanceolate, 3–10 cm. long, acute, attenuate to the base, serrate, puberulent or glabrate;

flowers very small, white, in dense verticels, these forming elongate, slender, much interrupted, leafy spikes or racemes, the bracts small, setaceous; calyx tube 1 mm. long, glabrate, the teeth ovate-deltoid, almost as long as the tube; corolla 3 mm. long. Pittier states that an infusion of the plant is a domestic remedy for colic, and this species is much used medicinally throughout Central America.

Hyptis vilis Kunth & Bouché. Regions of San Ramón and Navarro; La Hondura de San José; at 1,000–1,500 meters. Also in Nicaragua and Venezuela. Plants herbaceous, often decumbent, the stems mostly 30–60 cm. long, villous; leaves sessile, narrowly lance-oblong, 8–10 cm. long, acute, narrowed to a truncate or subcordate base, serrate, sparsely hirsute; flowers capitate, the heads globose, about 1.5 cm. in diameter, the bracts oblong-lanceolate, 5–6 mm. long, the peduncles 3–5 cm. long; calyx at anthesis 4 mm. long, the teeth subulate, almost equaling the tube; corolla white, the tube 4–4.5 mm. long.

LEONURUS L.

Herbs with palmate-lobate or dentate leaves; flowers small, white or pink, verticillate in the leaf axils; calyx tubular-campanulate, 5-nerved, almost equally 5-dentate, the teeth rigid, subulate or aristiform; corolla bilabiate, the upper lip erect, entire, the lower lip spreading or deflexed, 3-lobate; anthers 2-celled; nutlets 3-angulate. —No species of the genus are native in America.

Leonurus sibiricus L. *Chiquizá.* Naturalized abundantly along roadsides, in fields, and in waste places about the Meseta Central, sometimes found rather high on the slopes of the volcanoes. Native of the Old World. Plants annual or biennial, erect, usually less than a meter high, branched, puberulent or glabrate, the stems quadrangular; leaves long-petiolate, 3-parted into narrow, acute or acuminate, incised segments; calyx 6 mm. long, glabrous or puberulent; corolla purple-pink, densely puberulent, 8–12 mm. long.

LEPECHINIA Willd.

Perennial herbs; leaves usually rugose and dentate, the floral leaves reduced to small bracts; flowers small, verticillate, the verticels remote or aggregate to form a dense spike; calyx broadly campanulate, 10-nerved and reticulate-veined, subbilabiate, the teeth aristate, the calyx enlarged in fruit, declinate; corolla tube shorter than the calyx, the limb shortly bilabiate, the upper lip suberect, plane, emarginate, the lower 3-lobate; stamens 4, didynamous, the anthers

2-celled; nutlets ovoid, smooth.—One other Central American species occurs in Guatemala.

Lepechinia alpina (Oerst.) Standl., comb. nov. *Sphacele alpina* Oerst. Vid. Medd. Kjoebenhavn 1852: 36. 1853. *Alguelagum alpinum* Kuntze, Rev. Gen. 2: 572. 1891. Alpine region of Volcán de Irazú, at 2,880–3,000 meters, *Oersted 15775* (photo. of type seen, ex herb. Copenhagen). Paramo thickets of Cerro de Las Vueltas, at 3,000 meters. Endemic. Plants about 30 cm. high, the stems simple, or branched above, hirsute-villous; basal leaves long-petiolate, oblong-triangular and subhastate, about 8 cm. long and 4 cm. wide, narrowed to the obtuse apex, truncate at the base, undulate-crenate, green above, glandular and sparsely long-pilose, paler beneath, densely long-villous; verticels of flowers few and distant, the pedicels about 2 mm. long; calyx in fruit 15 mm. long, costate, glandular-punctate and densely long-villous; corolla pale blue.

MARSYPIANTHES Mart.

Small herbs with viscid pubescence; leaves small, petiolate, dentate; flowers small, bracteate, capitate; calyx campanulate, accrescent in age, the 5 teeth subequal; corolla bilabiate, the lower lip saccate; stamens 4, didynamous, declinate, the anthers 1-celled; nutlets ovoid, flattened, with a membranous, fimbriate wing.—No other species are found in Central America.

Marsypianthes Chamaedrys (Vahl) Kuntze. *Yerba de San Carlos. M. hyptoides* Mart. Frequent in the Meseta Central, in thickets, woods, or waste places; region of San Ramón. Widely distributed in tropical America. Stems slender, much branched, prostrate, often forming small mats, 80 cm. long or less, sparsely or densely viscid-villous; leaves ovate to oblong-lanceolate, 1–4 cm. long, acute or obtuse, coarsely dentate or crenate, acute or obtuse at the base, sparsely villous-pilose; heads axillary, globose, 1–2 cm. in diameter, dense, short-pedunculate, the bracts linear-lanceolate; calyx usually purplish, thin, viscid-villous, the teeth ovate or triangular, attenuate, finally spreading; corolla purple to white, the tube about equaling the calyx. The plant is an inconspicuous weed, usually almost hidden by the taller vegetation among which it grows.

MENTHA L. Mint

Aromatic, perennial herbs; leaves sessile or petiolate, dentate, punctate; flowers very small, white or pink, verticillate, the verticels axillary or forming terminal spikes; calyx 10-nerved, the teeth equal

or nearly so; corolla tube shorter than the calyx, the limb 4-cleft; stamens 4, equal, erect, included or exserted, the anthers 2-celled; nutlets ovoid, smooth.—No species of the genus is native in Central America, although one species, at least, is native in Mexico. *Mentha Piperita* L., peppermint, and *M. viridis* L., spearmint, two Old World species cultivated and naturalized in some parts of North America, are well known for their use in flavoring food and for their medicinal properties.

Mentha citrata Ehrh. *Yerbabuena.* Frequent in pastures or marshes about the Meseta Central and on the lower slopes of the volcanoes; region of Dota. Native of Europe. A perennial with leafy stolons, the stems weak, decumbent or ascending; leaves petiolate, oblong to ovate, mostly 4–5 cm. long, obtuse or acute, sharply serrate, glabrous or nearly so; verticels forming short, terminal spikes. In Costa Rica this plant rarely if ever blossoms.

OCIMUM L. Basil

Herbs or low shrubs, erect, branched; leaves petiolate, usually dentate; flowers verticillate; calyx deflexed in fruit, the tube campanulate or ovoid, 5-lobate, the lobes conspicuously unequal, the lower ones partially united; corolla white or pale purple, the tube usually shorter than the calyx, the lobes subequal; stamens 4, didynamous, the lower pair appressed to the lower lip of the corolla; nutlets smooth or rugose.—Probably no other species are found in Central America.

Ocimum Basilicum L. *Albahaca.* Often planted in gardens for use in domestic medicine and for flavoring food. Native of tropical Asia. An erect, densely branched annual, usually 60 cm. high or less, glabrous below, pubescent above with short, recurved hairs; leaves elliptic to ovate or oblong, 2–4 cm. long, remotely dentate or entire, glabrous; verticels forming spikes 20 cm. long or less, the pedicels almost obsolete; calyx in fruit 5 mm. long; corolla 4–5 mm. long. This is the cultivated basil, used in many regions of the earth for flavoring food.

Ocimum micranthum Willd. Strangely enough, I find no Costa Rican specimens or records of this species, but there is no doubt that it occurs in the country, since it is common in most inhabited parts of Central America. Widely distributed in tropical America. A low, bushy herb, 60 cm. high or less, pilose; leaves ovate or elliptic, dentate, 3–5 cm. long, obtuse or acute, rounded to

acute at the base; flowers on slender pedicels 2–3 mm. long; fruiting calyx 4–5 mm. long, the upper tooth obovate, the 2 lateral ones subulate-tipped, the 2 lower ones subulate.

PRUNELLA L.

Low, perennial herbs, usually decumbent; leaves entire to dentate or pinnatifid, the floral leaves reduced to bracts; flowers small, in 6-flowered verticels, forming a dense, oblong, terminal spike, the bracts broad and imbricate; calyx tubular-campanulate, subcompressed, 10-nerved and reticulate-veined, bilabiate; corolla tube exserted, the limb bilabiate, the upper lobe erect, entire, the lower one 3-lobate; stamens 4, didynamous, the anthers 2-celled; nutlets ovoid or oblong, smooth.—No other species is known from Central America.

Prunella vulgaris L. Potreros of Turrialba and Irazú, abundant in many places; doubtless introduced with grass seed. Native of the North Temperate Zone. Plants pilose or almost glabrous, the stems erect or usually decumbent, mostly 30 cm. high or less, simple or sparsely branched; leaves petiolate, oblong or oblong-lanceolate, obtuse or subacute, narrowed at the base, entire or crenate, 3–10 cm. long; spikes 10 cm. long or less, about 1.5 cm. broad, the bracts broadly ovate-orbicular; corolla usually violet or purple, twice as long as the calyx. Although this plant is native in some parts of the United States and Mexico, I have no doubt that in Costa Rica it is an importation.

ROSMARINUS L. Rosemary

Shrubs; leaves linear, entire, coriaceous, the margins strongly revolute; flowers small, bluish or white, in short, axillary racemes; calyx ovoid-campanulate, bilabiate; corolla tube exserted, the limb bilabiate; perfect stamens 2; nutlets subglobose, smooth.—The genus consists of a single species.

Rosmarinus officinalis L. *Romero.* Commonly grown in gardens for the sweet-scented foliage. Native of the Mediterranean region. A densely branched shrub, a meter high or less, the branches densely leafy, whitish-tomentose; leaves 2–3 cm. long, white-tomentose beneath.

SALVIA L.

Reference: Fernald, A synopsis of the Mexican and Central American species of *Salvia*, Proc. Amer. Acad. 35: 489–556. 1900.

Herbs or shrubs with entire or dentate leaves; flowers verticillate, the verticels forming spikes, racemes, or panicles; calyx usually naked in the throat, bilabiate, the upper lip entire or 3-dentate, the lower bilobate or bidentate; corolla conspicuously bilabiate, the upper lip entire, emarginate, or bilobate, the lower lip spreading, 3-cleft or 3-lobate; fertile stamens 2, the anthers 1-celled or imperfectly 2-celled; nutlets smooth, often developing mucilage when wet.—Numerous other species occur in Central America. The genus is a vast one, especially well developed in Mexico and in the Andes. Best known of its species is the common garden sage, *S. officinalis* L., Old World in origin, whose leaves are used in many regions for flavoring food. I do not remember ever to have seen this plant in cultivation in Central America.

Salvia Alvajaca Oerst. Vid. Medd. Kjoebenhavn 1852: 38. 1853. *Albajaca cimarrona*. *S. inaequilatera* Cufodontis, Archivio Bot. 9: 201. 1933 (southwestern slope of Volcán de Irazú, near Guayabillos, 2,250 meters, *Cufodontis 443*). In forest between Cartago and Candelaria, and on Volcán de Irazú, 1,800–2,100 meters, *Oersted 15751* (photo. of type seen, ex Herb. Copenhagen). In forest, sometimes along streams, mountains about the Meseta Central; region of San Ramón; at 1,050 meters or more. Panama. A branched herb, 50–100 cm. high, the branches glabrate; leaves long-petiolate, thin, elliptic or elliptic-ovate, mostly 7–12 cm. long, acuminate, gradually or abruptly narrowed at the base, serrate, glabrous or nearly so, slightly paler beneath; flowers white, the verticels remote, forming an interrupted raceme, the pedicels 5–8 mm. long, minutely pilosulous; calyx campanulate, green, in fruit 8–10 mm. long, glabrous or nearly so, the upper lip entire, the lower bifid, the teeth shortly subulate-acuminate; corolla about 1 cm. long. On the label of the type specimen of *S. Alvajaca* the locality is described as between Cartago and Candelaria.

Salvia bella Briq. Ann. Cons. Jard. Genève 2: 169. 1898. Along Río del Convento, *Pittier 10636*. A shrub, the branches glabrate, pilose only at the nodes; leaves petiolate, oblong-lanceolate, about 15 cm. long and 5 cm. wide, acuminate, cuneate-attenuate at the base, acutely serrate, glabrous or nearly so, somewhat paler beneath; verticels about 2-flowered, forming interrupted spikes, the pedicels in age 7–8 mm. long; calyx tubular, in fruit 17 mm. long, densely short-puberulent, purplish, the upper lip entire, ovate-acuminate, the lower 2-dentate, equaling the upper one; corolla red-purple, about 4 cm. long, the 2 lips 6–7 mm. long.

Salvia cataria Briq. Ann. Cons. Jard. Genève 2: 142. 1898. Forests of Rodeo de Pacaca, *Pittier 3256*. A tall herb, the branches densely and cinereously short-pilose; leaves long-petiolate, broadly ovate or ovate-elliptic, about 10 cm. long and 6 cm. wide, acuminate, rounded and shallowly cordate at the base, serrate, green and subglabrous above, paler beneath and cinerous-puberulent on the nerves; verticels 10-flowered, in dense, short or elongate spikes, the bracts ovate, small, deciduous; calyx campanulate, 3 mm. long, cinereous-puberulent, prominent-nerved, the upper lip ovate, short-acuminate, the lower equally long, the 2 teeth acuminate; corolla white, about 13 mm. long.

Salvia compacta Kuntze, Rev. Gen. 2: 530. 1891. *Jalacate, Chirrite*. The species was described with three varieties: *latifolia* Kuntze, loc. cit. (Turrialba, 1,400 meters, *Kuntze*); *irazuensis* Kuntze, loc. cit. (Irazú, at 3,000 meters, *Kuntze*); *Oerstediana* Kuntze, loc. cit. (Pacaca, *Oersted 29*). *S. menthiformis* Fernald, Proc. Amer. Acad. 35: 510. 1900 (Cartago, 1,300 meters, *Cooper 5902*). Common in thickets of the Meseta Central and on the slopes of the volcanoes; upper parts of the tierra caliente; region of San Ramón; 500–3,000 meters. Perhaps also in Guatemala. Plants a meter high or less, branched and often bushy, the stems cinereous-puberulent; leaves thin, slender-petiolate, ovate to rounded-ovate, acuminate, rounded and cordate at the base, crenulate-serrate, 2–5 cm. long, green and glabrate above, puberulent or glabrate beneath; racemes short and dense, with some remote lower verticels, the pedicels about 1 mm. long; calyx green, 3–4 mm. long, hispidulous, the teeth short, deltoid-subulate; corolla bright blue, pilose, 12 mm. long, the tube twice as long as the calyx. Costa Rican specimens have been referred to *S. polystachya* Ortega and *S. purpurea* Cav. The plant is common and well known in many parts of the Meseta Central, where it often provides beautiful displays of color.

Salvia costaricensis Oerst. Vid. Medd. Kjoebenhavn 1852: 39. 1853. *Hierba de corazón*. Aguacate and Jarís, at 600–900 meters, *Oersted 15749* (photo. seen of type, ex Herb. Copenhagen). Occasional in thickets and hedges of the Meseta Central, and in the upper part of the Pacific slope, mostly at 600–1,300 meters. Endemic. Plants weak and erect or decumbent, the stems 30–60 cm. long, villous; leaves thin and soft, long-petiolate, broadly deltoid, sometimes 15 cm. long, acute or obtuse, sagittate-cordate at the base, crenate-serrate, sparsely villous above, paler and almost glabrous beneath; verticels few-flowered, lax, remote, the pedicels 2–3 mm.

long or in age elongate; calyx campanulate, glandular-villous, 5 mm. long; corolla blue, glabrate, almost 1 cm. long. Easily recognized among local species by the broad, triangular, sagittate leaves.

Salvia drymocharis Epling in herb. Oak forest near Quebradillas, about 7 km. north of Santa María de Dota, Prov. San José, 1,800 meters, *Standley 42954*. Also *No. 42910* from the same locality. Plants suffrutescent, about a meter high, the branches puberulent; leaves slender-petiolate, thin, lanceolate or elliptic-lanceolate, mostly 15–17 cm. long and 3–6 cm. wide, attenuate-acuminate, cuneately attenuate to the base, closely crenate-serrate, green above and sparsely short-villous, slightly paler beneath, puberulent on the nerves and veins; verticels many-flowered, dense, forming a rather dense or lax raceme, the pedicels in fruit as much as 8 mm. long, puberulent; calyx in fruit 8 mm. long, glabrous, the lips subequal, the upper entire, acuminate, the lower bilobate; corolla white, 1.5 cm. long, sparsely short-pilose above, the tube almost twice as long as the calyx, the lips subequal.

Salvia fratrum Standl., sp. nov.—Herba perennis ut videtur erecta vel basi decumbens, ca. 30 cm. alta (vel altior), caulibus plerumque simplicibus gracilibus sat dense pilis brevibus recurvis cinereis puberulis; folia parva petiolata herbacea, petiolo gracili usque 8 mm. longo cinereo-puberulo; lamina oblongo-lanceolata vel lanceolata plerumque 1.5–2.5 cm. longa atque 3–6 mm. lata acuta vel subobtusa, basi attenuato-acuta, arcte adpresse crenato-serrata, supra viridis, nervis impressis, scaberula, subtus parum pallidior fere ubique breviter hispidulo-villosula; verticillastri pauciflori racemum sat densum 6 cm. longum efformantes, bracteis non visis, pedicellis 2–3 mm. longis dense cinereo-strigillosis; calyx tubulosus 4.5 mm. longus solemniter nervosus dense breviter cinereo-strigillosus, dentibus subaequalibus brevissimis triangularibus erectis acuminatis; corolla non visa.—Los Frailes, 1,600 meters, January, 1936, *Manuel Valerio 1370* (type in Herb. Field Mus.). The available material is scant and in unsatisfactory condition for study, but it evidently represents a species quite distinct from any other enumerated here.

Salvia hyptoides Mart. & Gal. *S. hyptoides* var. *subspicata* Fernald, Proc. Amer. Acad. 35: 498. 1900 (San Francisco de Guadalupe, *Tonduz 7228*). Frequent in pastures and thickets about the Meseta Central, also in the upper part of the Pacific slope; region of San Ramón; one collection seen from the Atlantic coast, where perhaps introduced; mostly at 1,300 meters or less. Panama to Mexico.

Plants annual, usually 50 cm. high or less, simple or branched, the stems sparsely pilose with chiefly appressed hairs; leaves small, slender-petiolate, thin, broadly deltoid-ovate or elliptic-ovate, acute, truncate or broadly cuneate at the base, crenate-serrate, villous on both surfaces; verticels many-flowered, very dense and headlike, forming a dense spike or the lower ones remote, the bracts conspicuous, green or purple, very broad, broadly rounded at the apex and abruptly short-pointed, long-ciliate; calyx hirsute, 4 mm. long. The variety described from Costa Rica, while usually differing from the common Mexican form in its dense spikes, is well matched by some Mexican specimens, and is probably of no systematic importance.

Salvia iodochroa Briq. Ann. Cons. Jard. Genève 2: 161. 1898. Ojo de Agua, 2,600 meters, *Pittier 3451*. Collected also on Cerro de Las Vueltas, and elsewhere in the region of Copey, 2,450–3,000 meters, growing in the uppermost forest belt. Endemic. An erect herb a meter high, branched, the stems villous; leaves thin, long-petiolate, broadly ovate, about 8 cm. long and almost as broad, obtuse to acuminate, deeply cordate at the base, coarsely crenate-dentate, green above, often purple beneath, sparsely villous; verticels about 6-flowered, forming long, rather lax racemes, the pedicels 7 mm. long or less; calyx tubular, 13 mm. long, purplish, sparsely glandular-villous, the upper lip ovate, acuminate, the lower lip of equal length, bidentate; corolla purple-red, 3 cm. long, the lower lip longer than the upper, deflexed.

Salvia irazuensis Fernald, Proc. Amer. Acad. 35: 540. 1900. Volcán de Irazú, Prov. Cartago, 3,000 meters, *J. D. Smith 4920*. Collected also at La Esperanza, on the slopes of Irazú. Endemic. Plants about a meter high, branched, the stem purple, crisp-pilose or glabrate; leaves cordate-ovate, 6 cm. long or less, acuminate, serrate, green and glabrate above, pale beneath and appressed-pilose on the nerves; racemes elongate, 40 cm. long or less, the verticels all remote, the pedicels 8 mm. long or shorter; calyx 8 mm. long, puberulent, short-pilose on the nerves, the upper lip ovate, half as long as the tube, the lower lip with 2 lance-ovate, setaceous-acuminate lobes; corolla red-purple, 15 mm. long, the pilose galea shorter than the lower lip.

Salvia occidentalis Swartz. *Verbena*. Common in thickets, along roadsides, and in waste ground, Meseta Central to the coasts; region of San Ramón. Widely distributed in tropical America. Plants slender, decumbent or prostrate, rooting at the lower nodes,

densely viscid-pubescent, at least on the stems and calyces; leaves small, slender-petiolate, ovate, mostly 2–5 cm. long, obtuse to acuminate, narrowed or truncate at the base, serrate; verticels few-flowered, forming much elongate and interrupted spikes, the pedicels very short; calyx 3 mm. long; corolla blue, 5 mm. long. One of the commonest weeds of Central America, especially about dwellings. The very viscid calyces adhere readily to clothing and to the skin and feathers of animals, thus spreading the seeds widely. The plant has a strong and disagreeable odor, and largely on that account, probably, finds common use in domestic medicine.

Salvia ourophylla Briq. Ann. Cons. Jard. Bot. Genève 2: 126. 1898. Cañas Gordas, 1,100 meters, *Pittier 11169*. Reported from several localities of the central region, at middle elevations. Endemic. A tall, branched herb, the stems short-puberulent or glabrate; leaves slender-petiolate, oblong-lanceolate, about 12 cm. long and 5 cm. wide, acuminate, cuneate-attenuate at the base, closely crenate-serrate, sparsely pilose above, paler and glabrate beneath; verticels 10-flowered, forming long and dense racemes, the pedicels 2–8 mm. long; bracts small and deciduous; calyx tubular or tubular-campanulate, 5.5–9 mm. long, pilosulous on the nerves, the upper lip ovate, short-acuminate, the lower 2-dentate; corolla white, 2–3 mm. longer than the calyx.

Salvia permixta Briq. Ann. Cons. Jard. Genève 2: 129. 1898. Pastures of Rancho Flores, 2,030 meters, *Pittier 1898*. Collected also at El Roble on Irazú, 2,000 meters. Endemic. Plants tall and branched; leaves long-petiolate, ovate or ovate-elliptic, 6–9 cm. long, 4–5 cm. wide, acuminate, rounded-cuneate at the base, crenate-serrate, dark green and sparsely villous above, glabrous beneath; verticels 6-flowered, forming interrupted racemes, the rachis and pedicels glandular-puberulent, the bracts deciduous, the pedicels 2–10 mm. long; calyx campanulate-tubular, at first 3 mm. long, in fruit as much as 10 mm., subglabrous, the upper lip ovate, acuminate, the lower lip of equal length, deeply cleft, the lobes lance-acuminate; corolla violaceous, 5 mm. longer than the calyx, the tube included, the lower lip deflexed, equaling the upper one.

Salvia Pittieri Briq. Bull. Soc. Bot. Belg. 30, pt. 1: 237. 1891. Region of Tierra Blanca, slopes of Irazú, 2,000 meters, *Pittier*. Endemic. Plants suffrutescent, the stems villous; leaves petiolate, ovate-lanceolate, about 8 cm. long and 4 cm. wide, acute, acuminate to the petiole, crenate, villous on both surfaces; verticels forming a

rather dense raceme 13 cm. long, the pedicels 4 mm. long or less; bracts broadly ovate, caducous, covered with a yellow-red wool; calyx tubular-campanulate, 13 mm. long, densely lanate; corolla dark red, the tube included in the calyx, the upper lip 1.5 cm. long.

Salvia pteroura Briq. Ann. Cons. Jard. Genève 2: 139. 1898. Along Río de La Unión, *Pittier 10637*. Apparently frequent in forest and clearings in the region of San Ramón, also elsewhere at middle elevations on the Pacific slope. Panama. A shrub 1.5–2.5 meters high, the branches glabrous; leaves slender-petiolate, lanceolate or broadly lanceolate, mostly 7–10 cm. long and 3–4 cm. wide, long-acuminate, attenuate to the base, closely serrate, glabrous and green above, slightly paler beneath, pilosulous on the nerves, elsewhere glabrous; verticels forming rather dense racemes, the pedicels only 1–2.5 mm. long; calyx campanulate or campanulate-tubular, 5–6 mm. long, or in age as much as 9 mm., purplish, pilose on the nerves, elsewhere glabrous; corolla blue, 5 mm. longer than the calyx, the tube included in the calyx, the lower lip shorter.

Salvia purpurea Cav. Reported by Fernald (Proc. Amer. Acad. 35: 547. 1900) as collected in Costa Rica by Oersted, the locality unknown. Extending to Mexico. A tall, branched herb, the stems minutely puberulent or glabrate; leaves petiolate, ovate, acute or acuminate, rounded or shallowly cordate at the base, serrate, glabrate, paler beneath; verticels forming numerous dense, rather short, panicled racemes, the bracts small and inconspicuous, deciduous, the pedicels short; calyx tubular, tinged with purple, in flower about 8 mm. long, densely appressed-pilose, the lips subulate-acuminate; corolla purple, about 2.5 cm. long. The Costa Rican record is very doubtful, and the collection on which it is based may have been collected elsewhere, since no recent collector seems to have found this showy plant in Costa Rica.

Salvia serotina L. *S. micrantha* Vahl. In waste ground, Limón, *Quirós 519*. Southern Mexico to Panama and West Indies. Plants low, short-pilose, much branched; leaves long-petiolate, ovate or rounded-ovate, 1–4 cm. long, obtuse, rounded or subcordate at the base, crenate-serrate; verticels forming slender racemes 2–10 cm. long, distant; calyx longer than the pedicels, tubular, in age 5–8 mm. long, glandular-pilose; corolla 6–10 mm. long, white or blue.

Salvia splendens Sellow. Cultivated for ornament about San José, and doubtless elsewhere. Native of Brazil. Plants a meter high or less, suffrutescent, puberulent or villous; leaves long-petio-

late, ovate to broadly elliptic-ovate, acuminate, obtuse or contracted and decurrent at the base, crenate-serrate, glabrous; calyx tubular-campanulate, bright red, pubescent, 2 cm. long; corolla scarlet, 3–4 cm. long.

Salvia tiliifolia Vahl. Thickets, forests, and cultivated fields, frequent about the Meseta Central; region of Dota. Mexico to Ecuador. Plants annual, a meter high or less, usually much branched, the stems glabrate; leaves long-petiolate, thin, ovate to rounded-ovate, obtuse or acute, truncate or rounded at the base, closely crenate, almost glabrous; verticels forming numerous long and rather lax racemes, the pedicels 4 mm. long or less; calyx green, tubular-campanulate, in fruit 5 mm. long, hispidulous on the nerves, elsewhere glabrous; corolla blue, only slightly exceeding the calyx. A coarse and weedy plant, plentiful in some localities of the central region.

Salvia Tonduzii Briq. Ann. Cons. Jard. Genève 2: 157. 1898. Hedges near San José, *Tonduz 1476*. Regions of San José and San Ramón, 1,100–1,800 meters. Endemic. A shrub of 1.5 meters or less, the branches glabrous; leaves slender-petiolate, oblong-lanceolate to broadly ovate, mostly about 12 cm. long and 5 cm. wide, long-acuminate or caudate-acuminate, cuneate at the base, crenate-serrate, glabrous or nearly so; verticels forming very dense, short racemes, the bracts showy, broadly orbicular-ovate, large, apiculate, purple-red, caducous, the pedicels short; calyx tubular, 12 mm. long or in age larger, bright red, pilose; corolla bright red, 3 cm. long, the tube ventricose above, the lips very short and inconspicuous.

Salvia Wagneriana Polak. Linnaea 41: 391. 1877. Hedges and roadsides near San José, *Polakowsky 387*. Plants frutescent, the branches glabrous, terete; leaves slender-petiolate, ovate-oblong, acuminate, 10 cm. long and 4 cm. wide or smaller, cuneate at the base, glabrous; bracts reniform, acuminate, 2 cm. long, red; calyx inflated-campanulate, 1 cm. long, red; glandular-pilose, the lips ovate, acuminate; corolla 3 cm. long, red. This and *S. Tonduzii* are probably identical, but I have seen no material of *S. Wagneriana*, and am not altogether certain that *S. Tonduzii* should be placed with it in synonymy.

SCUTELLARIA L.

Reference: E. C. Leonard, The North American species of *Scutellaria*, Contr. U. S. Nat. Herb. 22: 703. 1927.

Herbs or low shrubs; flowers blue or violet, in bracteate, often secund, spikelike racemes, sometimes solitary or fasciculate in the leaf axils; calyx campanulate, gibbous, bilabiate, the lips entire, the upper one cristate or saccate dorsally; corolla glabrous within, the limb bilabiate, the upper lip arched, entire or emarginate, the lower lip spreading or deflexed; stamens 4, didynamous, the anthers 2-celled; nutlets papillose or tuberculate.—A few other species are represented in Central America.

Scutellaria argentata Leonard, Journ. Wash. Acad. Sci. 17: 170. 1927. La Florida, *Lankester*. A tall, slender herb, the branches glandular-pubescent; leaves slender-petiolate, oblong-elliptic or oblong-obovate, obscurely panduriform, acuminate, cordate at the base, coarsely serrate, glandular-puberulent beneath on the nerves, otherwise glabrous; flowers in a terminal raceme 8 cm. long, the pedicels 2–2.5 mm. long; calyx 4 mm. long, glandular-pubescent; corolla bright crimson, sparsely pubescent, 4–5 cm. long.

Scutellaria costaricana Wendland, Hamb. Gart. Zeit. 19: 29. 1863. *Pavoncillo rojo*. Type collected by Wendland in Costa Rica, the locality not indicated. Frequent in forests of the central region, descending to the tierra caliente; region of San Ramón; mostly at 1,400 meters or less. Endemic. Plants herbaceous, branched, usually 1 meter high or often much lower, the branches sparsely brown-puberulent; leaves short-petiolate, mostly oblong or ovate-oblong, more or less panduriform, 8–12 cm. long or larger, acute or acuminate, somewhat narrowed to a subcordate base, sinuate-dentate or almost entire, minutely puberulent on the veins, otherwise glabrous; racemes short, of few or numerous flowers, the pedicels 4 mm. long or less, puberulent; calyx 3–4 mm. long, puberulent; corolla bright red, 4–5 cm. long, very slender, glabrous or nearly so. A rather handsome and showy plant because of the large, brightly colored flowers.

Scutellaria glabra Leonard, Contr. U. S. Nat. Herb. 22: 715. 1927. *Platanillo*. Cañas Gordas road, *Pittier 11194*. Mountains south of Cartago, at about 1,400 meters; region of El General. Endemic. Plants simple or branched, glabrous; leaves slender-petiolate, elliptic-ovate, 10–16 cm. long, acuminate, cordate at the base, sinuate-dentate or undulate; racemes 6–10 cm. long, the pedicels 4 mm. long or less; calyx 3–4 mm. long; corolla bright red, 1.5–2 cm. long; nutlets tuberculate.

Scutellaria longifolia Benth. *S. isocheila* Donn. Smith, Bot. Gaz. 57: 426. 1914 (Cerro de Las Caricias, 1,800 meters, *Pittier 16128*). Frequent in forests of the central region, mostly at 1,300–2,400 meters. Extending to Guatemala and perhaps to southern Mexico. Plants slender, erect, less than a meter high, the stems minutely puberulent; leaves slender-petiolate, ovate to oblong-lanceolate, 4–10 cm. long, acute or subobtuse, rounded to acute at the base, coarsely crenate-serrate, much paler beneath, minutely puberulent on the veins, otherwise glabrous; flowers in short or elongate racemes, the pedicels 6 mm. long or less, puberulent; calyx 3–6 mm. long, puberulent; corolla bright red, 2–3 cm. long, pubescent; nutlets black, tuberculate.

Scutellaria orichalcea Donn. Smith. Laguna de La Escuadra, near El Copey. Ranging to southern Mexico. Stems erect, mostly 25 cm. high or less, puberulent; leaves slender-petiolate, oblong-ovate, 1–5 cm. long, obtuse, acutish to rounded at the base, remotely crenate to entire, usually purplish, minutely puberulent on both surfaces, the upper surface sparsely villous; racemes short and dense, the pedicels 3–5 mm. long, puberulent; calyx 3–4 mm. long, puberulent; corolla yellow, 2 cm. long, pubescent; nutlets black, granular.

Scutellaria purpurascens Swartz. Frequent in thickets of the Meseta Central, descending to the Atlantic tierra caliente, at 1,500 meters or less. Panama and Lesser Antilles. Plants perennial, erect or ascending, mostly 40 cm. high or less, rarely taller, the branches densely puberulent; leaves slender-petiolate, deltoid-ovate, 3–7 cm. long, obtuse, rounded to cordate at the base, sinuate-crenate, sparsely pubescent above, puberulent beneath on the veins, otherwise glabrous; racemes short, few-flowered, 2–6 cm. long, the pedicels 3–4 mm. long, densely puberulent; calyx 2–3 mm. long, sparsely puberulent; corolla blue or purple, 1–1.5 cm. long, pubescent; nutlets brown, tuberculate.

Scutellaria purpurascens var. **heterophylla** Benth. Frequent in thickets about the Meseta Central. Guatemala. Differing from the species in having acute or acuminate leaves, mostly 2–4 cm. long; flowers purple or red-purple.

STACHYS L.

Reference: Epling, Preliminary revision of American *Stachys*, Repert. Sp. Nov. Beih. 80: 1–75. 1934.

Annual or perennial herbs; flowers verticillate, the verticels generally forming an elongate, interrupted, leafy raceme; calyx

turbinate or campanulate, the teeth subequal, mostly spinose-aristate; corolla tube usually slightly arcuate, the limb bilabiate, the upper lip erect, concave, the lower spreading, trifid; stamens 4, didynamous, the anthers 2-celled; nutlets smooth or verrucose.—One or two other species are known from Central America.

Stachys costaricensis Briq. Bull. Soc. Bot. Belg. 30: 240. 1891. San José, *Pittier 34*. Frequent in forest, thickets, pastures, or marshy places of the central region, mostly at 1,100–1,800 meters. Panama to southern Mexico. Plants repent or decumbent, weak, rooting at the lower nodes, the stems pilose with retrorse-spreading hairs or almost glabrous; leaves thin, long-petiolate, ovate, mostly 3–5 cm. long, obtuse or subacute, truncate or cordate at the base, crenate-serrate, sparsely pilose; calyx 5–5.5 mm. long, short-hirtellous; corolla pink, the tube 5–6 mm. long.

Stachys Pittieri Briq. Ann. Cons. Jard. Genève 2: 119. 1898. Valle de Los Arcángeles, Cerros de Escazú, *Pittier 240*. In forests, slopes of the central mountains, 1,500–2,600 meters. Endemic. Plants ascending or procumbent, 1 meter high or less, the stems short-pilose; leaves slender-petiolate, deltoid-ovate, mostly 3–4 cm. long, subacute, cordate at the base, crenate-serrate, soft-pilose; calyx 6–8 mm. long, pilose; corolla tube 6–8 mm. long. Material of this species has been confused with *S. Macraei* Benth., a Chilean plant.

Teucrium vesicarium Mill. (*T. inflatum* Swartz) may well occur in the Atlantic tierra caliente, since it is common in some parts of the Central American coast, but I have seen no Costa Rican material or records.

SOLANACEAE. Potato Family

By Paul C. Standley and C. V. Morton

Herbs, shrubs, or trees, sometimes scandent, occasionally epiphytic; leaves alternate or rarely subopposite, without stipules, simple and entire to pinnatifid; flowers perfect, regular or nearly so, mostly cymose or solitary; calyx inferior, commonly 5-lobate; corolla gamopetalous, usually 5-lobate, the lobes induplicate-valvate or plicate in bud; stamens as many as the corolla lobes and alternate with them, inserted on the tube, all or only part of them fertile, the anthers commonly 2-celled; ovules numerous, on axile placentae; style slender, simple, the stigma terminal; fruit baccate or capsular.—A few other genera are represented in Central America.

ACNISTUS Schott

Shrubs or small trees; leaves broad, entire, petiolate; flowers small, in sessile, lateral fascicles, long-pedicellate; calyx campanulate, persistent, truncate or with 5 short teeth; corolla subcampanulate to almost funnelform, the limb spreading, 5-lobate; stamens 5, the filaments slender, the anthers short, erect; ovary 2-celled, with many ovules, the stigma bilamellate; fruit a globose berry; seeds compressed, rugulose.—No other species are known from Central America.

Acnistus arborescens (L.) Schlecht. *Güitite.* Frequent in hedges and thickets in the region of Cartago, descending to the Atlantic tierra caliente, in the region of Turrialba, mostly at 600–1,400 meters; Zarcero, 1,500 meters. Guatemala to West Indies and South America. Usually a shrub or tree of 3–6 meters, the bark rough; leaves slender-petiolate, elliptic to oblong or ovate, thin, mostly 5–15 cm. long, acute or obtuse, acute at the base, glabrous above or nearly so, floccose-tomentose beneath; fascicles dense and many-flowered, the pedicels 1.5–3 cm. long; calyx 4 mm. long, the teeth short and rounded, glabrous; corolla white, 12 mm. long, glabrous outside, with very short, spreading lobes; berries yellow, 5–6 mm. in diameter. A common shrub in hedges around Cartago. The fruit is edible, and is sometimes made into jelly. It is much eaten by birds. The shrub is said to flower several times during the year.

ATHENAEA Sendtn.

Plants herbaceous, unarmed, the leaves thin, entire or sinuate-dentate or sublobate; pedicels fasciculate in the leaf axils; calyx campanulate, shallowly or deeply 5-lobate, in fruit accrescent and more or less enclosing the fruit; corolla subrotate, the lobes valvate; fruit baccate.—A few other species may be found in Central America.

Athenaea sylvarum Standl. & Morton, sp. nov.—Herba ramosa erecta, 0.9 m. alta; rami angulati, superne strigosi; folia solitaria, breviter petiolata, petiolo 0.5–1.2 cm. longo; lamina late lanceolata, 6–11 cm. longa, 2.3–4 cm. lata, acuminata, basi cuneata, membranacea, integra, subtus in venis parce pilosula; inflorescentia axillaris, pauciflora, sessilis, pedicellis floriferis 5 mm. longis, fructiferis 7.5 mm. longis; calyces campanulati, floriferi 2.5 mm. longi, externe puberuli, tubo 2 mm. longo, lobis triangularibus, fructiferi acuti, ca. 7 mm. longi, membranacei, inflati, non angulati, aperti; corolla pentamera, pallide viridis, rotata, 5.5 mm. longa, lobis ovatis,

margine puberulis; filamenta 3 mm. longa, gracilia, glabra; antherae late oblongae, 1.2 mm. longae, longitrorsum dehiscentes; ovarium et stylus glabri.—Finca La Cima, north of El Copey, Prov. San José, alt. 2,100–2,400 meters, December, 1925, *Standley 42812* (type in U. S. Nat. Herb., No. 1,252,975). Not closely related to other North American species, from which it is distinguished by the very small flowers and fruits. The genus differs from *Capsicum* in its accrescent, membranous calyx, the slender, glabrous filaments, and short anthers. From *Physalis* it may be distinguished by the open fruiting calyx, with broad, not acuminate, connivent lobes and by the clustered, not solitary flowers.

BROWALLIA L.

Plants annual, often with viscid pubescence; leaves thin, entire; flowers showy, blue, white, or violet, solitary, lateral or in terminal, one-sided racemes; calyx narrowly campanulate, 4–5-dentate; corolla salverform, the limb somewhat asymmetric, spreading, 5-lobate; perfect stamens 4, didynamous, included in the corolla, the fifth one rudimentary or absent; ovary 2-celled, short-stipitate, the style filiform, the stigma bilamellate; capsule enclosed in the calyx, the valves 2-cleft; seeds reticulate.—No other species are known from Central America.

Browallia americana L. *B. demissa* L. Common in fields and along roadsides in the Meseta Central, also in forests on the slopes of the central mountains, mostly at 1,800 meters or less; descending to the Atlantic tierra caliente; region of San Ramón; frequently grown in gardens for ornament. Widely distributed in tropical America. Plants 60 cm. high or usually lower, branched, glabrous, or glandular-pubescent above; leaves ovate, 2–6 cm. long, acute or acuminate, acute to rounded at the base, slender-petiolate; flowers mostly solitary, the slender pedicels 5–15 mm. long; calyx in flower 3–4 mm. long, with narrow teeth; corolla bright blue or violet, rarely white, the slender tube 10–13 mm. long, the limb 12 mm. broad; capsule 6–8 mm. long. Called Chavelita de monte in Panama and No-me-olvides and Simpática in Salvador. The plant is sometimes grown in gardens in the United States and Europe.

Browallia speciosa Hook. Naranjo; mountains south of Cartago; 1,700–2,450 meters. Extending to Colombia. Plants larger and stouter, probably perennial, almost glabrous; calyx in flower 1.5–2 cm. long, with long and narrow lobes; corolla purple, the tube 2.5–3.5 cm. long, the limb as much as 5 cm. wide, the lobes short-

acuminate. This plant must be an exceedingly handsome and showy one when in flower.

BRUNFELSIA L.

Shrubs or trees; leaves entire, mostly coriaceous; flowers large and showy, terminal, solitary or clustered; calyx campanulate or tubular, 5-lobate; corolla salverform, the limb 5-lobate, spreading, the lobes obtuse or rounded at the apex; stamens 4, didynamous, included; ovary 2-celled; fruit globose or ovoid, fleshy or coriaceous, indehiscent or tardily dehiscent; seeds rugose.—No species are native in Central America.

Brunfelsia nitida Benth. *Iris.* Planted for ornament at Alajuela (collected by Estrella Umaña), and probably elsewhere. Native of the West Indies. A shrub or small tree, glabrous; leaves oblanceolate or oblong-obovate, acute, attenuate to the base; flowers short-pedicellate, the calyx lobes broad and foliaceous; corolla white, the slender tube 10–11 cm. long, the limb broad and spreading.

CAPSICUM L.

Annual or perennial herbs, or shrubs; leaves thin, entire or repand-dentate; flowers solitary or in sessile, axillary or lateral umbels, small, usually white; calyx campanulate, not or scarcely accrescent, truncate or shallowly lobate; corolla almost rotate, the tube very short, the 5 lobes imbricate; stamens 5, the anthers free, longitudinally dehiscent; ovary 2–3-celled, the stigma clavate; fruit baccate, often very pungent; seeds compressed.—A few other species are found in Central America. The following treatment of this genus is not an altogether satisfactory one as regards generic limits. It seems decidedly questionable whether the common plants of Central America having soft, succulent stems, broad, thin leaves, and small, very juicy fruits should be included in the same genus with such plants as *Capsicum annuum* and *C. frutescens.* Mr. Morton suggests that if *Lycianthes* is separated from *Solanum* on the basis of a truncate calyx, *Capsicum* should, for the sake of consistency, be divided similarly. He suggests, therefore, that *Brachistus* might well be maintained as a distinct genus, and that the species with truncate calyx might also be divided into two genera: *Capsicum,* with slender, free, glabrous filaments, blue anthers, and a shining, pungent berry; and *Aureliana,* with broad, partly connate filaments pubescent within, yellow anthers, and a berry that is neither shining nor pungent. In these matters I am quite in agreement with him, but for the

sake of convenience it seems advisable in the present treatment to limit the genus *Capsicum* as here treated, leaving a more satisfactory disposition of the species for a monographic study. The key here presented has been prepared by Mr. Morton. It omits the common hot peppers, *C. annuum* and *C. frutescens*, which are well known plants.—P. C. Standley.

Key to species

Pubescence of stems, leaves, and calyces partly of simple, partly of branched hairs.

Flowers pentamerous; calyx stellate-pilose.....*C. asterotrichum.*

Flowers tetramerous; calyx glabrous.....*C. multiflorum.*

Pubescence all of simple hairs.

Calyx margin deeply undulate-ruffled; corolla conspicuously green-spotted; anthers orbicular, the connective thickened; style clavate.....*C. maculatum.*

Calyx margin truncate or dentate, plane; corolla unspotted; anthers ovate or oblong, the connective not much thickened; style not clavate.

Calyx truncate; plants eglandular.

Calyx hairy externally.

Flowers tetramerous. Stems appressed-tomentose; inflorescence few-flowered; corolla lobes ovate..*C. tetramerum.*

Flowers pentamerous.

Corolla tube slender, about 1.5 mm. wide, longer than the lobes; stems appressed-pilose...*C. fuscoviolaceum.*

Corolla tube thick, 5 mm. wide, shorter than the lobes; stems long-hirsute.....*C. macranthum.*

Calyx glabrous or merely ciliate.

Calyx ciliate; corolla tube 2.5 mm. long; inflorescence many-flowered.....*C. costaricense.*

Calyx not ciliate.

Corolla tube (6–7 mm. long) longer than the lobes; calyx 4 mm. long; inflorescence many-flowered; leaf blades oblong to broadly lanceolate.....*C. macrophyllum.*

Corolla tube (3 mm. long or less) shorter than the lobes; calyx 1.5–2 mm. long; inflorescence 1–5-flowered; leaf blades narrowly lanceolate....*C. stenophyllum.*

Calyx dentate; plants glandular.

Calyx teeth subulate; leaf blades entire, obtuse or cuneate at the base.....*C. subulatum.*

Calyx teeth low-triangular; leaf blades usually dentate, truncate or cordate at the base.....*C. stramoniifolium.*

Capsicum annuum L. *Chile, Chile dulce.* Cultivated commonly for the fruits. Native of America, the original habitat unknown. Plants annual; fruits usually large and inflated but sometimes small, sweet or often very hot. This cultivated plant, unknown in a wild state, is presumably a derivative of *C. frutescens* and its forms. As Indian names Pittier reports Dipá-boró-boró (Bribrí) and Ibofriurí (Térraba).

Capsicum asterotrichum Standl. *C. solanaceum* var. *pubescens* Kuntze, Rev. Gen. 2: 450. 1891 (Limón, *Kuntze*). Common in forests and thickets of the Atlantic tierra caliente, ascending the slopes of the central mountains to 2,200 meters; Guanacaste; region of San Ramón. Panama. A coarse herb, branched, the stems brittle, soft, villous with spreading, at least in part branched hairs; leaves large, ovate or elliptic, acute or acuminate, rounded to acute and usually very unequal at the base, mostly entire or somewhat repand, villous on both surfaces, part of the hairs branched; umbels many-flowered, the flowers long-pedicellate; calyx truncate, 3–4 mm. long; corolla white, 8 mm. long, densely tomentulose; berries juicy, bright red, about 8 mm. in diameter. This species is one of a group well represented in Mexico and Central America, the plants being referred to *Capsicum* on technical grounds, although in habit, inflorescence, and fruit they are very unlike the common cultivated peppers. Their fruits are not pungent. This genus of Solanaceae is badly in need of revision, and some of the names used here are only provisional. The specimens referred at present to *C. asterotrichum* may well represent more than one species, but the lines along which they are separable are not clearly evident.

Capsicum costaricense Standl. & Morton, sp. nov.—Rami adpresso-pilosi; folia geminata, valde inaequalia, petiolata, petiolis foliorum majorum 2.5–3 cm. longis, petiolis foliorum minorum 5–7 mm. longis, lamina foliorum majorum ovato-elliptica, 12–17 cm. longa et 7–8 cm. lata, acuta, basi oblique rotundata, integra, membranacea, utrinque glabrata; lamina foliorum minorum ovata 2.7–6.5 cm. longa, basi rotundata; inflorescentia multiflora (–20), pedicellis gracilibus, ca. 2 cm. longis, glabris, apice incrassatis; calyx 1.5

mm. longus, truncatus, glaber, ciliatus; corolla pentamera, tubo 2.5 mm. longo, lobis oblongis, 5.5 mm. longis, margine tomentulosis; filamenta 1 mm. longa, intus pubescentia; antherae oblongae, 2 mm. longae et 1 mm. latae; ovarium glabrum; stylus gracilis, 6.5 mm. longus, glaber.—Suerre, Llanuras de Santa Clara, Prov. Limón, alt. 300 meters, February, 1896, *J. D. Smith 6672* (type in U. S. Nat. Herb., No. 1,335,162). This differs from all species listed, except *C. macrophyllum* and *C. stenophyllum*, in the glabrous leaves and calyces. From those two, the present species is distinguished by the ciliate calyx. In addition, *C. costaricense* differs from *C. macrophyllum* in its smaller calyx (1.5 mm. as against 4 mm.), shorter corolla tube (2.5 mm. as against 6–7 mm.), and in its more numerous and slenderer pedicels. From *C. stenophyllum* it differs in its broader leaf blades, and in its many-flowered inflorescences.

Capsicum frutescens L. *Chile, Chilpete.* Frequent in thickets of the tierra caliente, ascending to the Meseta Central; found chiefly about dwellings, but sometimes in remote places. Native of America, the original habitat uncertain. Plants shrubby or herbaceous, sometimes 2 meters high, densely branched; flowers solitary; fruit small, oblong and narrowed to the apex, usually about 1 cm. long. Indian names reported by Pittier are Tiésh (Bribrí), Ketshua-ká (Brunka), Kras-kuó (Térraba).

Capsicum frutescens var. **baccatum** (L.) Irish. *Chile.* Often cultivated, and frequently escaped about dwellings. Differing from the typical form of the species only in the form of the fruit, which is globose and less than 1 cm. in diameter. This is the common chile or hot pepper used in most tropical regions of the earth, as well as elsewhere, for flavoring food. Chile is most popular in Mexico and in Central America it is used but little, at least so far south as Costa Rica. As local names Pittier reports Dipá-boró-boró (Bribrí) and Ibo-friurí (Térraba), Sha (Cabécara), Dipá, Baca-ri-pá (Bribrí), Iebá, Dshebá (Brunka), Iebó (Térraba).

Capsicum fuscoviolaceum (Cufodontis) Morton & Standl., comb. nov. *Brachistus fuscoviolaceus* Cufodontis, Archivio Bot. 10: 44. 1934. *B. poasensis* Cufondontis, op. cit. 45 (Volcán de Poás, 2,200–2,400 meters, *Cufodontis 596*). Volcán de Irazú, southwestern slope near Guayabillos, 2,250 meters, *Cufodontis 397*. Also at El Achote, slopes of Volcán Poás. Endemic. Plants herbaceous or suffrutescent, sometimes shrubby and as much as 4 meters high, the branches villous with simple hairs; leaves unequal, slender-petiolate,

broadly lanceolate to ovate-lanceolate, about 12 cm. long and 6 cm. wide, short-acuminate, obtuse or acute at the base, entire, villlous or short-villous, especially beneath along the nerves; flowers densely fasciculate, 5–15 in a cluster, the pedicels villous, mostly 2–3 cm. long; calyx 4–5 mm. long, truncate, villous; corolla dark violaceous or yellowish, 10–13 mm. long, densely and closely tomentulose outside; fruits globose, red, glabrous, about 1 cm. in diameter. This species probably is represented also by other collections from the higher mountains that have been referred heretofore to *C. macrophyllum*. We have seen type material of both the *Brachistus* species listed, and are unable to see that they represent two species.

Capsicum macranthum Standl. & Morton, sp. nov.—Herba 1.2–1.5 m. alta; rami hirsuti, pilis magnis flaccidis septatis; folia saepe geminata, inaequalia, petiolata, petiolo hirsuto, usque ad 7 cm. longo; lamina foliorum majorum ovalis, 20–26 cm. longa, 10–14.5 cm. lata, acuta, basi rotundata, saepe obliqua, membranacea, integra, supra parce hirsuta, subtus praesertim in venis hirsutula; inflorescentia ca. 7-flora, sessilis, pedicellis reflexis, 2–2.5 cm. longis; calyx 5–6 mm. longus, truncatus, cupulatus, externe densissime hirsutus; corolla pentamera, ochroleuca, externe purpurascens, rotata, ca. 2.5 cm. diam., tubo ca. 6 mm. longo, lobis ovatis ca. 1 cm. longis, externe perspicue longe hirsutis; filamenta 3 mm. longa, ubique dense pubescentia; antherae oblongae, 6 mm. longae, longitrorsum dehiscentes; ovarium elongatum, glabrum; stylus glaber.—La Hondura, Prov. San José, alt. 1,200–1,500 meters, March, 1926, *Standley & Valerio 51906* (type in U. S. Nat. Herb., Nos. 1,306,906–7). Yerba Buena, Prov. Heredia, *Standley & Valerio 49702*. La Estrella, Prov. Cartago, *Standley 39203, 39462*. Vara Blanca de Sarapiquí, 1,500–1,750 meters, *Skutch 3179*. The following specimens in the Herbarium of Field Museum, some of them not in the best condition for study, are all apparently referable to this species: Santo Domingo de Vara Blanca, 2,200 meters, *M. Valerio 1565, 1567*. San Antonio de San Ramón, 1,300 meters, *Brenes 3720*. Los Angeles de San Ramón, 1,025 meters, *Brenes 3950*. El Muñeco, 1,350 meters, *Stork 2686;* fruits red. La Brisa de Zarcero, 2,300 meters, *Austin Smith H401*. Guadalupe de Zarcero, 1,250 meters, *Austin Smith A364*. Mr. Smith's notes include the following data: Ravine slopes in cloud zone, or among grass in forest glades; low-growing, soft-stemmed, all parts of the plant with gray hairs; corolla cream-yellow with spots of emerald green at the base of each lobe; anthers creamy white.

Capsicum macrophyllum (HBK.) Standl. Frequent in thickets of the Atlantic tierra caliente; ascending the mountains of the central region to 2,000 meters; region of San Ramón. Guatemala to Colombia. Similar to *C. asterotrichum;* plants usually a meter high or less, much branched, the stems pilose with simple, chiefly appressed hairs; leaves large, usually acuminate, most of them entire, glabrous or nearly so; flowers white or pale yellow, about 8 mm. long; fruits small, orange or bright red, juicy. It is doubtful whether the specific name *macrophyllum*, based on Colombian material, is really applicable to the Central American plant, but no more satisfactory name seems to be available.

Capsicum maculatum Standl. & Morton, sp. nov.—Frutex 2 m. altus; rami angulati, sparse hirsuti; folia geminata, valde inaequalia, majora longe petiolata, petiolo 3.5–5 cm. longo; lamina foliorum majorum plus minusve obovata, 27–28 cm. longa, 14–17 cm. lata, acuminata, basi rotundata, integra, tenuiter membranacea, utrinque pilis hyalinis flaccidis subadpressis parce instructa; inflorescentia 4–8-flora, pedicellis 1.5–2 cm. longis, glabris, reflexis; calyx 3.5 mm. longus, glaber, perspicue undulato-crispatus sed margine ipso integro; corolla pentamera, flavescens, perspicue viridimaculata, tubo 5 mm. longo glabro, lobis ovatis, 8 mm. longis, externe longe pilosis; filamenta subteretia, 0.75 mm. longa, intus pubescentia; antherae orbiculares, 3 mm. longae et latae, connectivo lato, incrassato; ovarium glabrum; stylus clavatus, 6.5 mm. longus, glaber.—Vara Blanca de Sarapiquí, Prov. Alajuela, alt. 1,500–1,750 meters, July–September, 1937, *Skutch 3335* (type in U. S. Nat. Herb., No. 1,643,403). Río de La Paz Chiquito, 1,350 meters, *Pittier 16162*.

Capsicum multiflorum Standl. & Morton, sp. nov.—Suffrutex 1.5–2.5 m. altus; rami angulati, fistulosi, adpresso-pubescentes, pilis plerumque simplicibus; folia geminata, inaequalia, petiolo usque ad 4.5 cm. longo; lamina foliorum ovata vel oblonga, usque ad 28 cm. longa et 13 cm. lata, basi subcordata, membranacea, sparse pilosa, pilis simplicibus aut praesertim in costa et venis ramosis; inflorescentia multiflora, pedicellis gracilibus 1.5–2 cm. longis; calyx 1.5 mm. longus, truncatus, glaber; corolla tetramera, viridi-flava, externe purpurascens, 9 mm. longa, tubo 4.5 mm. longo, 1.8 mm. lato, lobis oblongis, externe puberulis; filamenta 1 mm. longa, pubescentia; antherae ovatae, 2 mm. longae; stylus gracilis glaber; baccae globosae, 4.5 mm. diam.—El Muñeco, Prov. Cartago, alt. 1,400–1,500 meters, March, 1926, *Standley & Torres 51170* (type in U. S. Nat. Herb., No. 1,306,641; duplicate in Herb. Field Mus.).

Capsicum stenophyllum Morton & Standl., sp. nov.—Frutex 3-metralis omnino glaber, ramulis gracillimis teretibus viridibus nodosis, internodiis elongatis; folia inaequalia saepe spurie geminata vel ternata breviter petiolata membranacea, petiolo gracili usque 1 cm. longo; lamina oblongo-lanceolata vel anguste lanceolata 9–14 cm. longa 1.5–4 cm. lata longe anguste attenuata, basin versus longe cuneatim attenuata, integra, subtus pallidior, costa tenera prominente, nervis lateralibus utroque latere ca. 6 valde obliquis angulo semirecto vel saepe multo latiore adscendentibus; inflorescentiae sessiles axillares umbelliformes 2–5-florae, pedicellis gracilibus in statu fructifero usque 2 cm. longis, in statu florifero multo brevioribus; calyx late campanulatus fere 2 mm. longus atque aequilatus truncatus ecostatus; corolla flava extus minutissime sparse puberula vel fere glabra 4 mm. longa fere ad basin lobata, lobis anguste triangulari-oblongis attenuato-acutis.—El Muñeco, Prov. Cartago, 1,500 meters, June, 1928, *H. E. Stork 2663* (type in Herb. Field Mus.). This may be only an extreme form of *C. macrophyllum*, to which it is evidently related, but leaf and flower characters are perhaps sufficient to justify specific rank. The following specimens in the United States National Herbarium are referred here: Vara Blanca, *Skutch 3313*. Santa María de Dota, *Standley & Valerio 43317*. La Estrella, *Standley 39236, 39213*. El Muñeco, *Standley 33469: Standley & Torres 51011, 51169, 51191*. Yerba Buena, *Standley & Valerio 49729, 49738*. Fraijanes, *Standley & Torres 47534*. Pejivalle, *Standley & Valerio 46919*. Cerro de Las Caricias, *Standley & Valerio 52041*. Quebrada Serena, Guanacaste, *Standley & Valerio 46214*. Naranjos Agrios, Guanacaste, *Standley & Valerio 46430*. Finca Montecristo, *Standley & Valerio 48640*. In the Herbarium of Field Museum are several recent collections: Zarcero, 1,350 meters, *Austin Smith A441, H46, A99*. Zapote de San Carlos, 2,000 meters, *Austin Smith H483*. Mr. Smith describes the plants as either suffrutescent and erect, or as subscandent, the flowers yellow, the fruit scarlet.

Capsicum stramoniifolium (HBK.) Standl. A single collection from the region of San Ramón, at 1,100 meters, is probably referable to this species, which extends to Mexico. Plants similar to *C. macrophyllum*, but glandular, the leaves usually larger and coarsely repand-dentate; flowers usually larger, more than 1 cm. long, white or pale yellow; calyx dentate.

Capsicum subulatum Standl. & Morton, sp. nov.—Frutex 1.8 m. altus; rami perspicue quadrangulares, sursum glanduloso-puberuli; folia geminata, longe petiolata, petiolo 1.5–3.7 cm. longo; lamina

elliptica, usque ad 10.5 cm. longa et 5.7 cm. lata, acuminata, basi obtusa vel late cuneata, integra, membranacea, utrinque parce puberula; inflorescentia pauciflora, pedicellis floriferis ca. 1 cm. longis, glanduloso-puberulis; calyx 3.5 mm. longus, externe glanduloso-puberulus, alte 5-lobatus, tubo ca. 1.8 mm. longo, lobis subulatis 1.7 mm. longis; corolla ochroleuca, 8.5 mm. longa, tubo 2.5 mm. longo, lobis ovato-oblongis, externe pubescentibus; filamenta 1.5 mm. longa, intus pilosa; antherae oblongae, 3 mm. longae, 1.5 mm. latae; ovarium glabrum; stylus 6 mm. longus, glaber; bacca globosa, 6 mm. diam.—Santa María de Dota, Prov. San José, alt. 1,500–1,800 meters, December, 1925, *Standley & Valerio 43257* (type in U. S. Nat. Herb., No. 1,253,159). Same locality, *Standley & Valerio 43123*.

Capsicum tetramerum Standl. & Morton, sp. nov.—Herba 2.5 m. alta; rami angulati, dense subtomentosi, pilis simplicibus; folia geminata, inaequalia, breviter petiolata, petiolo 1.3–2.8 cm. longo; lamina ovata, majores 14–17.5 cm. longae, 8–9.5 cm. latae, breviter acuminatae, basi oblique truncatae, membranaceae, paullo sinuatae, utrinque pilis subremotis simplicibus flaccidis subadpressis instructae; inflorescentia multiflora, pedicellis 1–1.3 cm. longis; calyx hemisphaericus, 2 mm. longus, truncatus, extus ubique dense pilosus; corolla tetramera, flava, 9 mm. longa, tubo 2 mm. longo, lobis oblongis, extus ubique dense adpresso-pubescentibus; stamina 4, filamentis latis, 1.5 mm. longis, extrorse glabris, intus basi longe denseque pilosis, antheris oblongis, albis, 2 mm. longis; ovarium globosum, glabrum; stylus gracilis, 6.5 mm. longus, glaber; bacca aurantiaca, globosa, 4 mm. diam.—El General, Prov. San José, alt. 880 meters, August, 1936, *Skutch 2862* (type in U. S. Nat. Herb., No. 1,642,734).

CESTRUM L.

Reference: Pierre Francey, Monographie du genre *Cestrum* L., Candollea 6: 46–398. 1935; 7: 1–132. 1936.

Shrubs or trees; leaves entire, petiolate; flowers yellow, white, orange, or purple, cymose or paniculate; calyx campanulate or tubular, 5-lobate or 5-dentate; corolla salverform or funnelform, the tube long and slender, the lobes usually short, spreading; stamens included, the filaments filiform, often pilose below and sometimes with a dentiform appendage; ovary 2-celled, the stigma entire or bilobate; fruit baccate; seeds smooth.—Numerous other species are known from Central America. Species of the genus are sometimes grown for ornament in hothouses of northern regions.

Cestrum acuminatum Francey, Candollea 6: 348. 1935. Cerro de Las Caricias, north of San Isidro, Prov. Heredia, 2,000–2,400 meters, *Standley & Valerio 52237*. Known only from the slopes of Volcán de Barba. Endemic. A shrub of 1.5–2.5 meters, the branches glabrous; leaves short-petiolate, oblong-lanceolate, 5.5–11 cm. long, 2–4.5 cm. wide, acuminate, membranaceous, glabrous; pseudostipules narrowly lanceolate, 2–3 mm. long; racemes terminal and axillary, the flowers 5–6, subspicate at the apex of the peduncle, the pedicels 1.2 mm. long, the bracts narrowly lanceolate, petiolate, 4–25 mm. long; calyx 5.5 mm. long, glabrous, the teeth triangular-lanceolate, acuminate, 1–2 mm. long; corolla green, usually tinged with dark purple, almost 3 cm. long, the lobes 5.5 mm. long; filaments dentate, pilosulous.

Cestrum alternifolium (Jacq.) O. E. Schulz. Collected only at Buenos Aires, Pacific coast, 480 meters. Yucatan to West Indies and northern South America. A slender shrub, the young branchlets sparsely pilose; leaves petiolate, ovate or oblong-ovate, 5–11 cm. long, 2–5 cm. wide, short-acuminate, rounded and decurrent at the base, membranaceous, sparsely pilose beneath along the costa; pseudostipules none; inflorescences terminal and axillary, shorter than the leaves, the flowers subsessile; calyx 3 mm. long, pilosulous outside, glabrous within, the teeth triangular, 0.5–1 mm. long; corolla greenish, 19–25 mm. long, glabrous outside, tomentose-puberulent within; filaments edentate, glabrous.

Cestrum Baenitzii Lingelsh. *Zorrillo*. Frequent in thickets and hedges of the central region, descending into the tierra caliente; common in the region of Dota; region of San Ramón; at 1,800 meters or less. Widely distributed in tropical America. A shrub or tree, sometimes 7 meters high, the branchlets glabrous or nearly so; leaves short-petiolate, larger than in other local species, oblong, mostly 15–30 cm. long, attenuate-acuminate, acute at the base, glabrous; pseudostipules none; inflorescences axillary, often on naked branches below the leaves, dense, the flowers sessile or nearly so; bracts none; calyx 2.5–3 mm. long, minutely puberulent or glabrate; corolla greenish white or pale green, 18 mm. long, glabrous; filaments edentate; fruit black or violaceous, about 9 mm. long. The flowers are not fragrant, in the daytime at least.

Cestrum calycinum HBK. Forests of the Atlantic tierra caliente, at 900 meters or less. Ranging to Argentina. A shrub or small tree, the branches stellate-tomentose; leaves short-petiolate,

ovate-elliptic or oblong-elliptic, 5–15 cm. long, 2.2–7.5 cm. wide, acute or acuminate, rounded to acute at the base, sparsely stellate-tomentose above or in age glabrous, stellate-tomentose beneath; pseudostipules none; racemes short, axillary, few-flowered, the bracts ovate-elliptic, obtuse; flowers sessile; calyx long-campanulate or tubular, 8–10 mm. long, villous-tomentose, the teeth 2 mm. long; corolla pale green, tomentose outside, the tube 17 mm. long, the lobes 4.5 mm. long; filaments without teeth at the base; fruit 12 mm. long.

Cestrum costaricense Francey, Candollea 6: 369. 1935. Volcán de Barba, *Brade 2306*. Perhaps also in Panama. Branchlets glabrous; leaves petiolate, ovate-lanceolate or elliptic-lanceolate, 6–9 cm. long, 2.5–4 cm. wide, subcoriaceous, acuminate, acute to rounded at the base, pale beneath and glabrous; pseudostipules none; flowers in terminal panicles, the pedicels 2–3 mm. long, the bracts lance-linear, 5–10 mm. long; calyx 4.5 mm. long, glabrous, the teeth 1 mm. long; corolla violaceous, 2.5 cm. long, glabrous inside and outside; filaments dentate, hirsute at the base.

Cestrum Donnell-Smithii Francey, Candollea 6: 247. 1935. La Concepción, Llanuras de Santa Clara, 250 meters, *J. D. Smith 6676*. Known only from the original collection. Branchlets glabrous; leaves petiolate, elliptic-lanceolate, 9–12 cm. long, 4–4.5 cm. wide, acuminate, acutish to rounded at the base, subcoriaceous, glabrous; pseudostipules none; racemes axillary, 6–7-flowered, the flowers subsessile; calyx tubular, 2 mm. long, minutely verruculose-glandular outside, glabrous within, the teeth triangular, 0.3 mm. long; corolla 2 cm. long, glabrous outside; filaments edentate.

Cestrum dumetorum Schlecht. Reported from Nicoya and Volcán de Irazú; Guanacaste (Líbano). Ranging to southern Mexico. A shrub or small tree, the branchlets glabrous; leaves long-petiolate, elliptic-lanceolate or oblong-lanceolate, 6.5–10 cm. long, 2.5–4.5 cm. wide, acute or short-acuminate, acute at the base, membranaceous, puberulent and subbarbate beneath along the costa; pseudostipules none; racemes terminal and axillary, the flowers sessile, the bracts minute; calyx tubular, 4–4.5 mm. long, villous-pilose outside, pubescent within; corolla yellow or violaceous, 1.5 cm. long, glabrous; filaments dentate, glabrous; berries 8 mm. long.

Cestrum Endresii Francey, Candollea 6: 281. 1935. At 1,500 meters, without definite locality, *Endres 109*. Region of El General. Endemic. Young branchlets sparsely puberulent; leaves petiolate,

oblong-lanceolate, 12–15 cm. long, 4–5 cm. wide, attenuate-acuminate, obtuse or subacute at the base, membranaceous, glabrous; pseudostipules none; flowers in terminal panicles, pedicellate, the pedicels 8 mm. long, glabrous; calyx campanulate, 3.5 mm. long, glabrate outside, glabrous within, the teeth triangular, 0.7 mm. long; corolla 23 mm. long, green, glabrous, pilose within at the insertion of the filaments; filaments edentate.

Cestrum fragile Francey, Candollea 7: 27. 1936. Río de La Paz, upper Sarapiquí, 1,380 meters, *Pittier 14168*. Slopes of Irazú and region of San Ramón, at 1,000–1,800 meters. Also in Panama. A shrub, sometimes scandent, the branches slender, the young branchlets sparsely puberulent; leaves almost sessile, membranaceous, ovate-lanceolate or oblong-lanceolate, 9–12 cm. long, 2.5–3.5 cm. wide, long-attenuate, cordate or rounded at the base, glabrous; pseudostipules falcate, ovate-lanceolate, sessile, 7–8 mm. long; flowers in terminal thyrses; bracts filiform, 1.5–3 mm. long; calyx 3 mm. long, sparsely pilose, glabrous within, the teeth cuspidate, 0.5–1.5 mm. long; corolla pale greenish yellow, 23 mm. long, glabrous without and within; filaments dentate, pilose below.

Cestrum fragile var. **grandiflorum** Morton, var. nov.—A var. typica floribus majoribus (28–33 mm. longis) differt.—Los Ayotes, near Tilarán, Guanacaste, 600–700 meters, January, 1926, *Standley & Valerio 45512* (type in U. S. Nat. Herb., No. 1,254,257). Same locality, *Standley & Valerio 45462*. La Tejona, Guanacaste, *Standley & Valerio 45847*. El Silencio, Guanacaste, *Standley & Valerio 44645*. Quebrada Serena, Guanacaste, *Standley & Valerio 46199*. This larger-flowered variety is found at low elevations (300–700 meters) in Guanacaste. The typical form of the species is found in the mountains, chiefly between 1,500 and 2,400 meters elevation. The typical form (with corolla 19–23 mm. long) is represented as follows in the National Herbarium: Cerro de Las Caricias, *Standley & Valerio 52031*. Yerba Buena, *Standley & Valerio 49719*. Santa María de Dota, *Standley & Valerio 43304*. Fraijanes, *Standley & Torres 47687*.

Cestrum gracile Francey (Candollea 6: 366. 1935), although listed by its author as Costa Rican, is, according to the locality cited (Veragua, *Warscewicz*), presumably a plant of Panama.

Cestrum irazuense Kuntze, Rev. Gen. 2: 450. 1891. *C. pallidum* Francey, Candollea 7: 85. 1936 (Laguna de La Escuadra, northeast of El Copey, 2,000–2,300 meters, *Standley 42073*). *C. Va-*

lerioi Francey, op. cit. 93. 1935 (Cerro de Las Vueltas, 3,000 meters, *Standley & Valerio 43597*). Volcán de Irazú, 2,600 meters, *Kuntze*. Frequent in forests and thickets of Volcán de Irazú, Cerro de Las Vueltas, and region of El Copey, at 2,000–3,000 meters. Endemic. A shrub of 1.5–3 meters, glabrous; leaves petiolate, elliptic-lanceolate, acuminate at each end, 6.5–10 cm. long, 1.7–3.5 cm. wide, coriaceous, the margins revolute; pseudostipules lanceolate, short-petiolate, 1.5–2 cm. long; flowers in terminal and axillary corymbs, the pedicels 3 mm. long; bracts linear, 1.5 mm. long; calyx tubular-campanulate, 3–4 mm. long, glabrous without and within, the teeth triangular-lanceolate, acuminate; corolla dull purple-red, 18–25 mm. long, glabrous outside, pilose within at the insertion of the filaments; filaments geniculate, short-dentate, pilose at the base; fruit white or pink, oblong or subglobose, 1 cm. long. A handsome and showy shrub in either flower or fruit.

Cestrum jacaltenanginum Loes. var. *tomentosum* Francey (Candollea 6: 119. 1935; Veragua, *Warscewicz 1*) is reported by its author from Costa Rica, but the locality, if properly stated, is in Panama.

Cestrum lanatum Mart. & Gal. *Zorrillo, Zorrillo blanco.* Frequent in hedges and thickets of the central region, and on the upper part of the Pacific slope, mostly at 1,000–2,000 meters, but reported from Irazú at 2,700 meters; regions of San Ramón and Dota. Mexico to Colombia. Usually a shrub of 2–5 meters, the branches densely stellate-lanate; bark smooth, grayish green or pale brown; leaves petiolate, ovate-lanceolate or oblong-lanceolate, mostly 7–14 cm. long and 2.5–7 cm. wide, acute or acuminate, acute or obtuse at the base, green and glabrate above, pale beneath and densely stellate-tomentose; calyx 4–5.5 mm. long, stellate-tomentose; corolla pale greenish yellow, partly closing in the daytime, 12–15 mm. long, the tube glabrous outside, the lobes sparsely stellate-tomentose; berries about 7 mm. long. The crushed leaves have a strong, mephitic odor, but the flowers are fragrant. The species may be recognized at once among Costa Rican Cestrums by the dense, stellate tomentum on most parts of the plant. It is said to be sometimes a tree of 7.5 meters with a trunk 17 cm. in diameter, covered with quite smooth, greenish gray bark.

Cestrum mariquitense HBK. var. **latifolium** (Francey) Standl. & Morton, comb. nov. *C. bogotense* Willd. var. *latifolium* Francey, Candollea 6: 211. 1935. El General, 600 meters, *Pittier 10509*. Known only from the type locality. The typical form of the

species is Colombian. Branchlets hirtous-puberulent; leaves oblong-lanceolate or elliptic-lanceolate, 4–7 cm. long, 1.5–3.5 cm. wide, cuspidate-acuminate, decurrent at the base, scaberulous beneath on the nerves; pseudostipules none; flowers axillary, sessile; calyx 4 mm. long, glabrous outside, the teeth 1.2 mm. long; corolla yellowish green, 3 cm. long, glabrous outside, pubescent within; filaments appendiculate. The specific name *bogotense* of Willdenow (1819) is antedated by that of HBK. Francey records *C. Sendtnerianum* Mart. from Costa Rica (page 348 of his monograph), but *Tonduz* (not *Pittier* as listed by Francey) *4734* from Boruca is exactly the same as *Pittier 10509* from El General, the type of his *bogotense* var. *latifolium*. *Cestrum Sendtnerianum* is, therefore, to be excluded from the flora of Costa Rica. It differs from *C. mariquitense* in having smooth rather than hirtellous branchlets.

Cestrum nocturnum L. var. **mexicanum** O. E. Schulz. *Zorrillo.* Occasional in thickets about the Meseta Central, and in the tierra caliente; sometimes planted in gardens for ornament. Mexico to Panama, the typical form of the species in Yucatan and West Indies. A slender shrub, the branchlets glabrous; leaves long-petiolate, membranaceous, oblong-elliptic to subovate, 5–12 cm. long, acuminate, usually acute at the base, glabrous in age, sometimes pilosulous when young; pseudostipules none; panicles axillary and terminal, many-flowered; calyx campanulate, 2–3 mm. long, sparsely puberulent without and within, the teeth ovate, 1.2 mm. long; corolla yellowish or greenish white, 17–20 mm. long, glabrous outside, the tube pilose within at the insertion of the stamens; filaments geniculate and dentate, pilose; berries 8–10 mm. long. The flowers are intensely fragrant, at least at night. Pittier reports the Guatuso name of Ko-kír for this plant.

Cestrum panamense Standl. *C. racemosum* R. & P. var. *panamense* Francey. Thickets and forests of the tierra caliente; region of San Ramón. Southern Mexico to Colombia. A tree of 9 meters or less, the branchlets puberulent or glabrate; leaves short-petiolate, ovate-lanceolate, 21 cm. long and 7 cm. wide or smaller, very thin, long-acuminate, usually rounded at the base, somewhat puberulent beneath or almost glabrous; pseudostipules none; flowers in small, axillary panicles, sessile; calyx 2–3 mm. long, pilosulous or glabrate outside, glabrous within; corolla greenish, about 15 mm. long, glabrous without and within; filaments edentate, glabrous; fruit white, 8 mm. long.

Cestrum Pittieri Francey, Candollea 6: 385. 1935. Near Desamparados, *Tonduz 1424*. Regions of San José and San Ramón, in hedges or thickets; sometimes planted for ornament. Panama to Salvador. A shrub, the branches stout, glabrous; leaves petiolate, elliptic-lanceolate, 8–15 cm. long, 2.5–4.5 cm. wide, acute, acute to rounded at the base, chartaceous, minutely glandular-pilose beneath or glabrate; pseudostipules few, lanceolate, 3 mm. long; inflorescences short, dense, axillary, almost sessile, the flowers sessile or nearly so; calyx 3–4 mm. long, sparsely puberulent outside, glabrous within, the teeth broadly triangular, 0.5 mm. long; corolla 1.5 cm. long, glabrous without and within; filaments dentate, glabrous.

Cestrum poasanum Donn. Smith, Bot. Gaz. 23: 253. 1902. Slopes of Volcán de Poás, at 2,500 meters, *J. D. Smith 6674*. In forests or thickets, slopes of Poás and Irazú, at 3,000 meters or less; regions of San Ramón and Zarcero, at 1,000–2,300 meters or more. Endemic. A slender shrub of 2–4 meters, often gregarious; the branchlets glabrous; bark pale brown; leaves petiolate, ovate-lanceolate or elliptic-lanceolate, mostly 8–15 cm. long, acuminate or long-acuminate, acute to rounded at the base, glabrous; inflorescences terminal and axillary, dense and many-flowered, the flowers short-pedicellate, the bracts lanceolate, long-acuminate, 6–7 mm. long; calyx campanulate, 3.5 mm. long, glabrous without and within, the teeth narrowly triangular, 1 mm. long; corolla violaceous or pale greenish yellow, 21 mm. long, glabrous outside, pilose within at the insertion of the stamens; filaments short-dentate, pilose at the base; berries 8 mm. long.

Cestrum reflexum Sendtn. Thickets and forests of the tierra caliente; region of San Ramón; Guanacaste; at 1,000 meters or less. Ranging to Brazil and Bolivia. A slender shrub, described as sometimes subscandent, the young branches puberulent or glabrate; leaves short-petiolate, oblong-lanceolate or ovate-lanceolate, 8–10 cm. long, 3.5–5.5 cm. wide, membranaceous, attenuate-acuminate, acute to obtuse at the base, glabrous or nearly so; pseudostipules none or very few; inflorescences axillary or terminal and paniculate, the floral leaves reduced but conspicuous, the flowers sessile; calyx campanulate, 3–3.5 mm. long, sparsely puberulent outside, glabrous within, the teeth triangular, 0.5–0.7 mm. long; corolla yellow or yellowish green, 22–27 mm. long, glabrous; filaments edentate, glabrous; fruit ellipsoid, 8.5 mm. long.

Cestrum rugulosum Francey, Candollea 7: 78. 1936. "Chemin du Littoral," southeastern slope of Volcán de Irazú, *Pittier 872*.

Reported also from the slopes of Barba. Endemic. A shrub of 3–4 meters, the branchlets glabrous or somewhat puberulent-tomentose; leaves long-petiolate, oblong-lanceolate or elliptic-lanceolate, attenuate-acuminate, acute at the base, not decurrent, membranaceous, glabrous above, sparsely puberulent beneath; pseudostipules none; inflorescences axillary, short, many-flowered, the bracts filiform, 2–2.5 mm. long, the pedicels 2 mm. long or less, pilose; calyx tubular-campanulate, 4.5 mm. long, glabrous without and within, the teeth triangular, 1.2 mm. long; corolla 23 mm. long, glabrous outside, pilose within at the insertion of the stamens; filaments dentate at the base and pilose.

Cestrum scandens Vahl. Region of Nicoya and perhaps elsewhere. Nicaragua to Colombia. A scandent shrub, 2.5 meters long or less, the branchlets puberulent or glabrous; leaves petiolate, ovate to oblong-lanceolate, 5–13 cm. long, 2.5–7.5 cm. wide, attenuate to acute at the apex, rounded or subcordate at the base, glabrous; pseudostipules none; panicles large, terminal, sometimes axillary, the bracts linear, 2–3 mm. long, the pedicels 1.5 mm. long or less; calyx tubular-campanulate, 4–5 mm. long, glabrous outside or obscurely glandular-puberulent, puberulent within below the teeth, the teeth 1 mm. long; corolla greenish white, 21–31 mm. long, glabrous without and within; filaments edentate, glabrous; fruit blue, obovoid, 9 mm. long.

Cestrum Standleyi Francey, Candollea 6: 249. 1935. Wet forest, Zurquí, Prov. San José, 2,000–2,500 meters, *Standley & Valerio 48082*. Known only from the original collection. A shrub, the branches glabrous; leaves short-petiolate, oblong-lanceolate, 7–10 cm. long, 2.5–3.5 cm. wide, attenuate-acuminate, obtuse at the base, subcoriaceous, glabrous; pseudostipules none; inflorescences axillary, pedunculate, few-flowered, the bracts filiform, 2–5 mm. long, the flowers sessile or nearly so; calyx tubular, 3.2 mm. long, glabrous without and within, the teeth triangular, acute; corolla 19 mm. long, glabrous without and within; filaments edentate, glabrous; fruit oblong, 9 mm. long.

Cestrum Urbanii Francey, Candollea 6: 371. 1935. Slopes of Volcán de Irazú, *Hoffmann 167*. Known only from the type locality. Branchlets glabrous; leaves petiolate, oblong-lanceolate or elliptic-lanceolate, acute or short-acuminate, cuneate and decurrent at the base, membranaceous, glabrous; pseudostipules none; flowers in small, terminal corymbs, the pedicels 2–6 mm. long; calyx long-campanulate, 2.5 mm. long, glabrous without and within; corolla

19 mm. long, glabrous without and within; filaments dentate, the teeth pilose; fruit oblong, 1 cm. long.

Cestrum Warscewiczii Klotzsch, Allgem. Gartenz. 19: 363. 1851. *Zorrillo, Pavoncillo. C. aurantiacum* Lindl. var. *Warscewiczii* Francey, Candollea 6: 103. 1935. *C. aurantiacum* var. *macrocalyx* Francey ex Cufodontis, Archivio Bot. 10: 45. 1934 (Volcán de Irazú, above Guayabillos, 2,200–2,500 meters, *Cufodontis 379*). *Habrothamnus aureus* Warsc. in herb. Volcán de Irazú, *Warscewicz 1738*. Common in hedges and thickets of the Meseta Central, ascending the slopes of the central mountains to about 2,700 meters; usually at 1,100–2,100 meters. Ranging to Guatemala and perhaps to southern Mexico. A shrub or small tree, sometimes as much as 12 meters high, with a trunk 25 cm. in diameter, the bark grayish, the young branchlets somewhat tomentulose; leaves slender-petiolate, ovate or oblong, mostly 4–6 cm. long and 2–3.5 cm. wide, short-acuminate, acute or obtuse at the base, glabrous; calyx 5–8 mm. long, glabrous outside, puberulent within, the teeth short, subulate; corolla orange, 2.5 cm. long, glabrous; filaments geniculate and subdenticulate; fruit white, oblong, 12 mm. long. This is a common shrub in many parts of the central region, especially in roadside hedges. Francey's var. *macrocalyx* differs in having a larger calyx, 9–12 mm. long; leaves 5.5–10.5 cm. long. *C. aurantiacum* f. *flavum* Kuntze (Rev. Gen. 2: 450. 1891; type from Costa Rica, at 1,000 meters, *Kuntze*) is a form described as having yellow rather than orange corollas.

CYPHOMANDRA Sendtn.

Shrubs or small trees, unarmed; leaves entire, 3-lobate, or pinnatisect; flowers in simple racemes, or the racemes usually scorpioid and forming a cyme; calyx small or large, 5-lobate, not accrescent in fruit; corolla subrotate, the tube very short, the limb deeply 5-lobate, the lobes valvate; filaments short, the anthers erect or incurved, the connective more or less thickened, the cells dehiscent by introrse slits; ovary 2-celled, the ovules numerous; fruit baccate, often very large; seeds compressed.—A few additional species are known from Central America.

Cyphomandra betacea (Cav.) Sendtn. *Tomate cimarrón.* Planted occasionally for its edible fruits. Native of Brazil. A shrub, usually 3 meters high or less; leaves large, softly pilose, cordate-ovate, acuminate, entire; flowers small, dull pink; fruits stalked, ovoid, about 5 cm. long, brownish red, obscurely striped. The fruits somewhat suggest the tomato in both appearance and flavor.

Cyphomandra costaricensis Donn. Smith, Enum. Pl. Guat. 6: 84. 1903. *Pepinillo*. *C. heterophylla* Donn. Smith, Bot. Gaz. 27: 436. 1899, non Taub. 1893. *C. dolichocarpa* Bitter, Repert. Sp. Nov. 17: 327, 1921 (La Hondura, 900 meters, *Wercklé*). *C. mollicella* Standl. La Emilia, Llanuras de Santa Clara, 250 meters, *J. D. Smith 6670*. Frequent in thickets or in pastures of the tierra caliente; region of San Ramón; at 1,000 meters or less. Panama to Honduras. A treelike shrub or large herb, 2–3 meters high, usually with a clean trunk and a spreading crown; leaves dimorphous, long-petiolate, the lower ones very large, pinnate-lobate, the upper ones broadly ovate and entire, abruptly short-acuminate, rounded or cordate at the base, minutely and softly pubescent beneath or almost glabrous; flowers green, in axillary, long, scorpioid racemes; calyx almost 5 mm. long, with broad, shallow lobes; corolla 1.5 cm. long; fruit ovoid or oblong, 10 cm. long or less. There is some doubt as to whether *C. dolichocarpa* is really synonymous with *C. costaricensis*. The former species was based upon apparently incomplete material, and the long and verbose description gives no characters that are not reconcilable with the common plant to which Captain Smith gave the name *costaricensis*.

Cyphomandra homalophylla Standl. Trop. Woods 10: 50. 1927. Changuinola Valley, *Cooper & Slater 39*. Known only from the type region. Young branches sparsely and minutely puberulent; leaves short-petiolate, oblong-elliptic, 18–29 cm. long, 7.5–11 cm. wide, acute, acute or abruptly short-decurrent at the base, entire, densely and very minutely puberulent beneath; inflorescences axillary, bifurcate, the pedicels 4–8 mm. long; calyx 4 mm. long, 5-lobate; corolla 1 cm. long. It is probable that the leaves in this species are all similar in outline, rather than dimorphous.

DATURA L.

Reference: Safford, Synopsis of the genus *Datura*, Journ. Wash. Acad. Sci. 11: 173–189. 1921.

Herbs, shrubs, or small trees; leaves alternate, petiolate, entire to lobate; flowers large, solitary, erect or recurved, usually white or purple; calyx spathaceous or tubular, often circumscissile near the base; corolla funnelform, the limb plicate, 5-lobate or 5-angulate; stamens included or slightly exserted; ovary 2-celled; fruit capsular, 4-valvate from the top, irregularly dehiscent, or indehiscent.—One or two additional species may be found in Central America.

Datura arborea L. *Reina de la noche. Brugmansia arborea* Steud. Planted commonly for ornament, especially about the Meseta Central, and in the temperate region generally, also in the tierra caliente; sometimes found as an escape near settlements. Believed to be native of the Andean region, perhaps of Peru. A shrub or small tree; leaves long-petiolate, broadly ovate to oblong-ovate, acuminate, entire or repand, villosulous or glabrate; calyx large, green, spathaceous, split along one side but otherwise entire; flowers very fragrant, pendent, the corolla white, about 25 cm. long; fruit baccate. In recent years this species has been listed frequently as *D. candida* (Pers.) Pasq., the specific name under which it was treated by Safford, but it now appears probable that the name *D. arborea* L. is the correct one. This is one of the handsomest and most showy of tropical shrubs, and a fine, large individual is a beautiful object in the morning, when the flowers are at their best. There are some long hedges of the plants in Costa Rica, and the showiest one I have ever seen surrounds a large field at the village of Cot on the lower slopes of Irazú. In some parts of Central America the plant is called Floripondio. There is a popular belief that the heavy fragrance of the flowers is conducive to sleep, and for that reason in some regions the flowers are placed by the pillows of persons affected with insomnia. Fruits are produced very rarely.

Datura Metel L. *Manto de Cristo, Manto de viuda, Tulipán.* Planted for ornament, and apparently also naturalized in some places of the central region. Native of the Old World. Plants annual, much branched, usually a meter or less in height, glabrous or nearly so; leaves ovate-lanceolate to elliptic, acute or acuminate, more or less repand; calyx tubular, about 6 cm. long, with 5 short teeth; corolla white within, usually violet outside, commonly 15 cm. long or less; fruit a subglobose capsule, covered with very short, blunt tubercles. Like other large-flowered Daturas, this plant is an exceptionally showy one. The flowers often bear several corollas, one within another.

Datura Stramonium L. *Tapate.* Occasional in waste ground, but apparently not common, Meseta Central to the coasts. Widely distributed in America and the Old World. Plants annual, large and coarse, bushy-branched, glabrous or nearly so; leaves ovate, acute or acuminate, irregularly sinuate-lobate or repand; flowers white or violet, 7–10 cm. long; calyx tubular, 5-dentate, green; capsule ovoid-globose, erect, 5 cm. long, densely covered with long, sharp prickles. The black seeds contain a narcotic poison. They

have been known to cause the death of children who happened to eat them, and by some of the aboriginal inhabitants of North America they were used as an anesthetic. Pittier reports that the leaves are applied as poultices to ulcers and other sores (as commonly in some parts of the United States), and that the dried leaves are made into cigarettes that are smoked to relieve asthma.

JUANULLOA Ruiz & Pavón

Shrubs, usually epiphytic, with thick branches, glabrous or stellate-tomentose; leaves entire; flowers rather large, solitary or cymose; calyx colored, tubular or campanulate, 5-lobate, the lobes valvate; corolla tubular, often ventricose above, the lobes small, broad, imbricate; stamens included, the filaments filiform, short or elongate, the anthers erect, oblong or linear, the cells longitudinally dehiscent; ovary 2-celled, the stigma bilamellate; fruit baccate or almost dry, indehiscent.—No other species are known from Central America.

Juanulloa Sargii Donn. Smith. Occasional in forests of the tierra caliente; regions of San Ramón and El General. Panama to Guatemala. A large or small, epiphytic shrub with thick, pale branches; leaves membranaceous, rounded-elliptic to obovate or elliptic, 7–20 cm. long, acute to rounded at the apex, usually acute at the base, when young finely stellate-tomentose, especially beneath, but in age glabrate, short-petiolate; flowers in cymes, pedicellate; calyx densely reddish-tomentose, 2.5 cm. long, the lobes oblong, acute; corolla densely yellow-tomentose outside, red within, twice as long as the calyx.

LYCIANTHES (Dunal) Hassler

Reference: Bitter, Die Gattung *Lycianthes*, Abh. Naturw. Ver. Bremen 24: 292–520. 1920.

Shrubs or herbs, often scandent, unarmed; leaves simple, mostly entire (in all the Costa Rican species), the upper ones usually falsely geminate and unequal; inflorescences umbelliform, commonly sessile in the leaf axils, mostly few-flowered; calyx short-campanulate, truncate, often bearing on the outside at or below the margin 5 or 10 subulate lobes or teeth; corolla rotate or stellate; filaments short, equal or unequal, the anthers mostly ellipsoid, erect and connivent, dehiscent by apical, introrse pores; fruit baccate, containing numerous seeds.—A large number of additional species are found in Central America. The plants usually have been referred to *Solanum*, but

as treated by Bitter the genus, distinguished by the form of the calyx, makes a natural and most convenient segregate from that group.

Lycianthes Austin-Smithii Morton & Standl., sp. nov.—Arbor 6–7.5 m. alta, trunco 10–20 cm. diam., ramulis sat crassis, novellis dense pilis minutis sordide ferrugineis stellatis indutis cito glabratis, internodiis brevibus; folia inaequalia breviter petiolata subcoriacea in sicco fusca, petiolo crassiusculo 5–10 mm. longo cito glabrato; lamina (in foliis majoribus) lanceolata, oblongo-lanceolata vel oblongo-ovata 7–14 cm. longa 1.7–5 cm. lata longe anguste acuminata vel rare acuta vel subobtusa, basi valde inaequali acuta et subdecurrens, supra glabra sublucida, subtus fere concolor, in axillis nervorum dense breviter barbata, aliter glabra, costa gracili prominente, nervis lateralibus utroque latere ca. 9 obliquis arcuatis angulo latiusculo adscendentibus; inflorescentia umbelliformis vel corymbosa axillaris pauciflora usque 1.5 cm. longe pedunculata, pedicellis crassiusculis 5–14 mm. longis dense ut ramulis stellato-tomentellis; calyx campanulatus 3.5 mm. longus et aequilatus truncatus extus sparse minute stellato-puberulus; corolla 8 mm. longa extus glabra 5-partita, lobis anguste oblongis; antherae oblongae 2.5 mm. longae; bacca globosa glabra apice late rotundata 8 mm. longa.—Zarcero, Prov. Alajuela, 1,950 meters, April, 1937, *Austin Smith 4117* (type in Herb. Field Mus.). Also *Nos. 4105* and *H176* from the same locality. "A tree on forested hillside with northern exposure; many trees about, but all small. Bark dark brown or obscure gray, rough to the touch. Flowers pale chalcedony yellow or pale greenish yellow. Fruits at first green, then creamy white, finally dark violet." There is some question as to the generic place of this plant, but if calyx characters are used for segregating *Lycianthes*, it is definitely referable there. On the other hand, the inflorescences are not strictly umbelliform, and they are not sessile.

Lycianthes dominicana Morton & Standl., sp. nov.—Frutex ut videtur scandens, ramis gracilibus teretibus pallide brunnescentibus glabratis, novellis sparse pilis adpressis sessilibus albidis longe pauciradiatis conspersis; folia breviter petiolata crasse membranacea, petiolo gracili 5–8 mm. longo glabro vel pilis stellatis paucis consperso; lamina elliptico-oblonga prope medium latissima ca. 9 cm. longa atque 2.5–4 cm. lata anguste acuminata, basi acuta, integra, supra sublucida ut videtur omnino glabra, costa prominente, subtus concolor hinc inde sed praesertim ad nervos pilis sessilibus stellatis pauciradiatis albidis remote conspersa, costa gracili prominente, nervis lateralibus utroque latere ca. 6 arcuatis teneribus obliquis

angulo ca. recto adscendentibus; umbellae ca. 7-florae sessiles, pedicellis gracilibus usque 5 mm. longis glabris; calyx campanulatus 2.5 mm. longus (vel longior?) truncatus extus glaber 10-costatus, infra marginem dentibus 10 alternatim inaequalibus onustus, dentibus subulatis, longioribus 1.5 mm. longis; corolla (in alabastro tantum visa) extus dense albide stellato-tomentosa.—Santo Domingo de Vara Blanca, 2,200 meters, February, 1937, *Manuel Valerio 1550.* The material available is scant and incomplete, but sufficient to show that a distinct species is represented, noteworthy for its almost complete lack of pubescence on inflorescence and foliage.

Lycianthes ferruginea Bitter. *L. ferruginea* var. *firmior* Bitter, Abh. Naturw. Ver. Bremen 24: 340. 1920 (descent from La Ardilla, near San Marcos, 900–1,355 meters, *Tonduz 7666;* also *Tonduz 7939* in part). Venezuela. A shrub, the branches conspicuously geniculate, densely stellate-tomentose with ferruginous, chiefly short-stipitate hairs; leaves mostly solitary, short-petiolate, broadly lanceolate or elliptic-lanceolate, 5.5–10.5 cm. long, 2.5–5 cm. wide, acute or acuminate, obliquely rounded or obtuse at the base, densely and closely stellate-pubescent on the upper surface, paler beneath and densely and softly stellate-tomentose; inflorescences about 4-flowered, the pedicels 10–15 mm. long; calyx 5 mm. long, truncate and furnished with 10 teeth 1–2 mm. long, ferruginous-stellate-tomentose outside; corolla white, 2 cm. broad; berries globose, 10–12 mm. in diameter; ovary glabrous.

Lycianthes furcatistellata Bitter, Abh. Naturw. Ver. Bremen 24: 401. 1920. Forests of La Palma, Prov. San José, 1,460 meters, *Tonduz 12612.* Known only from the region of La Palma and nearby slopes of Irazú, 1,400–1,600 meters. Endemic. A slender, scandent shrub, the young branches densely covered with lax, stipitate, few-rayed, stellate hairs; leaves subgeminate, those of a pair very unequal, the larger on petioles 1.5–4 cm. long, broadly lanceolate or ovate-lanceolate, mostly 8–10 cm. long and 3–5.5 cm. wide, rather long-acuminate, obtuse to subcordate at the base and often very unequal, green above and with numerous long-stipitate, mostly 2–3-radiate hairs, especially on the veins, or some of the hairs simple, beneath more densely stellate-villous; inflorescences 4–5-flowered, the pedicels 1.5–2 cm. long; calyx campanulate, 6–7 mm. long, the 10 teeth subulate, unequal, 2.5–4 mm. long; corolla violaceous, almost 2 cm. long, villous outside with simple and branched hairs; ovary glabrous; fruit globose, 5 mm. in diameter or larger.

Lycianthes grandifrons Bitter, Abh. Naturw. Ver. Bremen 24: 418. 1920. Llanos de Turrúcares, 600 meters, *Pittier 478*. Plants herbaceous, the branches pilose with simple hairs; leaves subgeminate, unequal, short-petiolate, broadly and obliquely lanceolate or rhombic-lanceolate, the larger 10–12 cm. long and 4.5–6 cm. wide, attenuate to the apex, cuneate-attenuate to the base, membranaceous, villous above with simple hairs, paler and villous beneath; flowers solitary, the pedicels 2–2.5 cm. long; calyx 7–8 mm. long, with 10 unequal, subulate teeth 4–6.5 mm. long, villous; corolla 3 cm. broad, more or less villous outside; ovary glabrous.

Lycianthes heteroclita (Sendtn.) Bitter. *Solanum heteroclitum* Sendtn. *L. heteroclita* var. *gracilis* Bitter, Abh. Naturw. Ver. Bremen 24: 496. 1920 (based in part upon Costa Rican material). Forests and thickets of the tierra caliente, ascending to 800 meters in the region of San Ramón. Panama to Guatemala. Plants erect, herbaceous or merely suffrutescent, branched, glabrous or practically so; leaves falsely geminate or ternate, membranaceous, glabrous, very unequal, short-petiolate, mostly rhombic-lanceolate, 15–18 cm. long or often much smaller, acuminate or long-acuminate, cuneately narrowed to the base; inflorescences 7–10-flowered, the pedicels 2 cm. long or less, glabrous or sparsely pilose; calyx truncate, naked, glabrous, in anthesis about 4 mm. long; corolla 14–16 mm. long, greenish purple, almost glabrous; ovary glabrous; berries globose, 11 mm. or less in diameter.

Lycianthes inaequalis Morton & Standl., sp. nov.—Arbuscula, ramulis teretibus aspectu glabris sed re vera microscopice puberulis, internodiis elongatis; folia spurie geminata, parium valde inaequalia, minora suborbicularia vel rotundato-ovata atque ca. 2 cm. longa, omnia firme membranacea, majora crasse ca. 1 cm. longe petiolata; lamina valde obliqua oblanceolato-oblonga usque oblongo-obovata vel late obovato-elliptica 13–23 cm. longa 5–9.5 cm. lata abrupte breviter acuta vel acuminata, basi acuta vel interdum late cuneata, in sicco subfusca, supra glabra, subtus vix pallidior, ad costam nervosque microscopice puberula, aliter glabra, costa gracili prominente, nervis lateralibus utroque latere ca. 7 gracilibus valde obliquis subarcuatis angulo semirecto vel latiore adscendentibus; inflorescentiae breviter graciliter pedunculatae axillares usque 4 cm. longae laxae pauciflorae, floribus subumbellatis vel breviter racemosis, pedicellis filiformibus usque 1.5 cm. longis glabris; calyx campanulatus ca. 2.5 mm. longus atque 4 mm. latus glaber truncatus, margine minute ciliolato; corolla viridescenti-alba 7 mm. longa extus glabra

ad medium vel profundius lobata, lobis acutiusculis ad marginem tomentulosis; ovarium glabrum.—Changuinola Valley, Panama, January, 1924, *V. C. Dunlap 396* (type in Herb. Field Mus.); also *No. 85a* from the same locality. Doubtless to be found in adjacent Costa Rica. The plant has much similarity with *Solanum Kenoyeri* Standl. of the Canal Zone in foliage characters, but the truncate calyx, without appendages, seems to make necessary its reference to *Lycianthes* rather than to *Solanum*.

Lycianthes Lankesteri Morton & Standl., sp. nov.—Ut videtur frutex erectus, ramis gracilibus plus minusve tortuosis teretibus viridibus, novellis dense pilis ochraceis adpressis pilosis, internodiis brevibus vel elongatis; folia breviter petiolata plerumque solitaria, altero parvo majoribus simili sed tantum ad 3 cm. longo ad nodum saepe adjecto, membranacea, petiolo vix ultra 6 mm. longo dense adpresso-piloso; lamina valde obliqua oblongo-lanceolata 12–16 cm. longa 3.5–5 cm. lata longe anguste attenuato-acuminata, basi solemniter obliqua uno latere attenuato-acuta, altero anguste obtusa, supra in sicco fusco-viridis in statu adulto tantum ad costam nervosque adpresso-pilosa, subtus pallidior saltem ad nervos venasque adpresso-pilosa, costa gracili elevata, nervis lateralibus utroque latere ca. 12 prominentibus, venulis laxissime inconspicue reticulatis; pedicelli ad nodum pauci, plerumque 2–5, graciles, usque 8 mm. longi, adpresso-hirsuti; calyx extus hispidus, pilis pro parte furcatis albidis patentibus, truncatus ca. 3 mm. longus, extus paullo infra marginem lobis 10 filiformibus viridibus fere aequilongis onustus; corolla (perfecta non visa) extus in alabastro dense hispidula.—Navarro, Prov. Cartago, July, 1924, *C. H. Lankester 954* (type in U. S. Nat. Herb.; photo. in Herb. Field Mus.). Related to the Guatemalan *L. amatitlanensis* (Coult. & Donn. Smith) Bitter, which differs conspicuously in the long, spreading pubescence of the leaves and other parts.

Lycianthes lenta (Cav.) Bitter. *Solanum lentum* Cav. Reported by Bitter as collected by Oersted at Cartago and San José. Mexico to Cuba and Venezuela. A scandent shrub, the young branches covered with a rather dense but close pubescence of stellate, short-stipitate hairs; leaves solitary or subgeminate, unequal, petiolate, membranaceous, the blades ovate or broadly ovate, 4–8 cm. long, 3–4 cm. wide, somewhat narrowed to an obtuse apex, rounded at the base or abruptly short-decurrent, sparsely stellate-pubescent above, paler beneath and densely and closely stellate-tomentose; inflorescences 4–6-flowered, the slender pedicels 15–23 mm. long; calyx 4.5–5 mm. long, with 10 subulate, unequal teeth 1–2 mm.

long, stellate-tomentose; corolla violaceous or white, 14–16 mm. long, stellate-tomentose outside; ovary glabrous; berries globose, red, 7–8 mm. in diameter.

Lycianthes multiflora Bitter, Abh. Naturw. Ver. Bremen 24: 361. 1920. *Tomatillo. L. multiflora* var. *extustomentosa* Bitter, op. cit. 363 (Turrialba, *Oersted 1386*); *L. multiflora* var. *plicitomentosa* Bitter, loc. cit. (Naranjo, *Oersted 1384*). Las Vueltas, Tucurrique, 635 meters, *Tonduz 13173* (photo. seen of type, ex herb. Berol.). Frequent in thickets and forests of the tierra caliente, ascending to 2,000 meters in the region of Zarcero; Guanacaste. Panama. A shrub of 2–3 meters, more or less scandent, sometimes climbing to 20 meters, the young branches densely covered with close, short-stipitate, stellate hairs; leaves solitary or subgeminate, those of a pair often very unequal, the larger ones petiolate, ovate-lanceolate to rounded-ovate, mostly 9–13 cm. long, abruptly long- or short-acuminate, usually rounded at the base and often abruptly short-decurrent, sparsely and finely stellate-pubescent above or almost wholly glabrous, paler beneath, closely stellate-pubescent chiefly or only on the nerves and veins; inflorescences 9–20-flowered, the slender pedicels 6–8 mm. long or in age much longer; calyx 4 mm. long, with 10 subulate teeth 1–1.5 mm. long, stellate-tomentose; corolla white or whitish, almost 2 cm. broad; ovary glabrous; berries subglobose, 7–10 mm. long.

Lycianthes Pittieri Bitter, Abh. Naturw. Ver. Bremen 24: 360. 1920. In forest, San Lorenzo de Dota, 1,250 meters, *Pittier 2277*. A shrub, the young branches ferruginous-stellate-tomentose; leaves subgeminate, those of a pair very unequal, the larger ones petiolate, ovate-lanceolate to broadly elliptic-lanceolate, 15–17.5 cm. long and 6–7 cm. wide, acuminate or long-acuminate, rounded or subcordate at the base, stellate-subtomentose above at first but later glabrate, stellate-tomentose beneath; inflorescences several-flowered, the pedicels 5–6 mm. long; calyx 3 mm. long, bearing at the apex 10 short teeth 1 mm. long or less, ferruginous-stellate-tomentose; corolla ferruginous-tomentose outside; ovary glabrous; berries subglobose, 6 mm. in diameter.

Lycianthes Storkii Morton & Standl., sp. nov.—Arbuscula, ramulis teretibus gracilibus dense pilis simplicibus ochraceis adscendentibus vel subadpressis pilosis, internodiis brevibus; folia inter minora breviter petiolata, paris inaequalia, minoribus majoribus similibus et tantum minoribus, petiolo crassiusculo usque 6 mm.

longo adpresso-piloso; lamina in foliis majoribus lanceolato-oblonga 5–12 cm. longa, 1.5–3 cm. lata, longe anguste attenuato-acuminata, basi valde inaequali acuta vel attenuata, membranacea, supra in sicco viridis subsparse adpresso-hirsuta, subtus multo pallidior sat dense pilis pallidis rigidulis adpresso-pilosa, costa crassiuscula prominente; flores axillares ut videtur solitarii, pedicellis gracilibus rectis in statu fructifero ca. 2.5 cm. longis dense pilis adscendentibus pilosis; calyx sub fructum persistens ca. 2 mm. altus atque 5 mm. latus pallidus adpresso-pilosus truncatus 10-costatus, paullo infra marginem dentibus 10 subaequalibus subulatis 1.5–3 mm. longis onustus; bacca globosa 6 mm. longa apice rotundata glabra.—About 1 km. southeast of Santa María de Dota, Prov. San José, 1,710 meters, August, 1932, *H. E. Stork 3138* (type in Herb. Field Mus.). Zapote de San Carlos, March, 1937, *Austin Smith H490*. The following additional collections are in the United States National Herbarium: Viento Fresco, Prov. Alajuela, 1,600–1,900 meters, wet forest, *Standley & Torres 47944*. Santa María de Dota, moist forest, 1,500–1,800 meters, *Standley & Valerio 43350, 43302*. A slender shrub of 1–1.5 meters, the fruit bright red.

Lycianthes synanthera (Sendtn.) Bitter. *Solanum synantherum* Sendtn. *S. mitratum* Greenm. ex Donn. Smith, Bot. Gaz. 37: 211. 1904 (Atirro, Prov. Cartago, 600 meters, *J. D. Smith 6673*). *L. mitrata* Bitter, Abh. Naturw. Ver. Bremen 24: 500. 1920. Frequent in the central region at middle elevations, chiefly 1,000–1,600 meters; region of San Ramón. Panama to Guatemala. A shrub or small tree, sometimes subscandent, the young branches sometimes with a few small, stellate hairs, but commonly glabrous; leaves often geminate and unequal, the larger on petioles 1.5–3 cm. long, oblong or elliptic-oblong, 7.5–20 cm. long, acuminate or long-acuminate, acute to rounded at the base, glabrous or practically so; inflorescences 10–18-flowered, the pedicels in flower 12–20 mm. long; calyx 3 mm. long, truncate, glabrous or nearly so, obscurely if at all costate; corolla blue-violet, 1.5–2 cm. broad, glabrous; ovary glabrous; berries globose, 6–7 mm. in diameter.

Lycianthes Valerii Morton & Standl., sp. nov.—Frutex 1–2-metralis ramosus, ramis gracilibus teretibus, junioribus tortuosis vel subgeniculatis dense pilis simplicibus rigidulis patentibus vel subincurvis pilosis, internodiis brevibus; folia superiora spurie geminata valde inaequalia membranacea breviter petiolata, minora suborbicularia fere sessilia ca. 1 cm. longa, majora fere 1 cm. longe petiolata; lamina in foliis majoribus anguste oblongo-lanceolata 10–

14 cm. longa 2–3.2 cm. lata longe anguste attenuato-acuminata, basin valde inaequalem versus sensim cuneato-attenuata, supra in sicco viridis fere omnino glabra, tantum ad costam pilis paucis remotis conspersa, subtus paullo pallidior pilis rigidulis albidis simplicibus vel interdum apice furcatis subhirsuta, costa tenera prominente, nervis lateralibus utroque latere 7–8 parum prominentibus obliquis arcuatis solemniter irregularibus; flores axillares solitarii nutantes, pedicellis crassiusculis in statu florifero vix ultra 3 mm. longis pilosis; calyx campanulatus 3–4.5 mm. longus et aequilatus sparse pilis longis patentibus pilosus viridis 5-costatus, truncatus, remote brevissime 5-dentatus, basi rotundatus; corolla lutescenti-viridis extus glabra 13 mm. longa ad medium 5-loba, lobis triangularibus acutis intus glabris.—Near Santa María de Dota, Prov. San José, moist forest, *Standley & Juvenal Valerio 43307* (type in Herb. Field Mus.). There is some question as to whether this plant is better referable to *Lycianthes* or to *Solanum*, but the former seems more reasonable and satisfactory.

Lycianthes villosula Bitter, Abh. Naturw. Ver. Bremen 24: 420. 1920. El Brasil, Río Virilla, Prov. Alajuela, 800 meters, *Pittier 3676*. Plants low, herbaceous, probably decumbent, the stems villous; upper leaves falsely geminate, unequal, short-petiolate, the blades obliquely oblong-lanceolate, 5–7.5 cm. long or smaller, subacute at the apex, cuneately narrowed to the base, villous on both surfaces with principally simple hairs; flowers solitary, the pedicels about 2 cm. long; calyx 5–6 mm. long, with 10 unequal, subulate teeth 2 mm. long or less, villous; corolla yellowish white, 1.5 cm. long; ovary glabrous.

LYCOPERSICON Mill. Tomato

Annual or perennial herbs; leaves pinnately or bipinnately divided; flowers small, yellow, in lateral, irregular, raceme-like cymes opposite the leaves; calyx 5-parted, with linear or lanceolate segments; corolla rotate, the tube very short, the limb 5-cleft, plicate; stamens inserted in the corolla throat, the filaments short, the anthers linear, connate or connivent, dehiscent by introrse slits; ovary 2–3-celled, the stigma capitate; fruit large or small, baccate.—No other species are known from North America.

Lycopersicon esculentum Mill. *Tomate.* The common tomato, perhaps originally from Peru, is cultivated in all inhabited parts of Costa Rica, although in some regions its growth is difficult because of a multiplicity of insect and fungus enemies. Pittier reports the Guatuso name of Uli-kámo.

Lycopersicon esculentum var. **cerasiforme** (Dunal) Hort. *Tomate, Tomatillo.* Frequent in waste ground about settlements; probably an introduction in Central America, since the plants never are found in places where they appear native. The wild plants are probably mere degenerate forms derived from seeds of garden plants. The variety differs from the common tomato only in its small, globose fruits, usually about 2 cm. in diameter.

MARKEA L. Rich.

Epiphytic or scandent shrubs, glabrous or nearly so, the pubescence, if any, of simple hairs; leaves entire, commonly coriaceous, often approximate at the ends of the branches; flowers large, subracemose along a short or elongate, conspicuously nodose rachis; calyx 5-lobate, the lobes valvate; corolla funnelform or salverform, the tube ampliate above, the lobes broad, imbricate, spreading in anthesis; stamens included or short-exserted, the filaments filiform, elongate, the anthers oblong or linear, erect, dehiscent by longitudinal slits; ovary 2-celled, the style elongate, the stigma bilamellate; fruit baccate, oblong or globose, almost dry.—A few other species are known from Central America.

Markea leucantha Donn. Smith, Bot. Gaz. 31: 116. 1901. *Metternichia Wercklei* Schum. ex D. Bois, Rev. Hort. 82: 149. 1910 (La Palma, *Wercklé*). *Merinthopodium leucanthum* Blake, Contr. Gray Herb. 52: 87. 1917. Estrella, Prov. Cartago, 1,800 meters, *J. D. Smith 5887.* Frequent in the central region, ascending the slopes of the mountains to at least 2,400 meters; region of San Ramón, at 1,000 meters or more. Panama. A small or large, epiphytic shrub, often forming large, dense clumps, the branches stout and nodose; leaves coriaceous, short-petiolate, obovate-oblong to oval, mostly 6–15 cm. long, acute to broadly rounded at the apex, slightly or greatly narrowed to the base, glabrous; flowers clustered at the tips of the leafy branches, often very numerous, pedicellate, the pedicels usually pilose; calyx campanulate, 10–13 mm. long, pilosulous or glabrous, the lobes broad, short-cuspidate; corolla white or yellowish, about 6 cm. long; stamens exserted. This is one of the handsomest of all the many epiphytic shrubs of Costa Rica, most abundant at the edges of pastures on the upper mountain slopes, where it often forms dense masses over old stumps. The large clusters of white flowers are exceedingly handsome, and strongly fragrant. There seems to be no good reason for placing the plant in some genus other than *Markea*, as was done by Blake. Both this and the following species

agree in general characters with numerous South American plants that have been referred to *Markea*. If *Merinthopodium* is a good genus, which seems rather improbable, some of the South American Markeas will have to be transferred to it.

Markea neurantha Hemsl. Biol. Centr. Amer. Bot. 2: 429. 1882. *Merinthopodium neuranthum* Donn. Smith, Bot. Gaz. 23: 12. *pl. 1.* 1897. Type, *Endres 534*, without definite locality. Frequent in forests of the upper part of the Atlantic tierra caliente, ascending to the upper slopes of the central region, to 2,500 meters or more; region of San Ramón. Extending to Guatemala. A large or small, epiphytic shrub, rarely terrestrial, glabrous except for the often hirsutulous peduncles, pedicels, and calyx; leaves petiolate, subcoriaceous or membranaceous, elliptic-oblong to obovate-oblong, mostly 10–25 cm. long, acuminate to attenuate-acuminate, acute at the base; peduncles usually greatly elongate, slender, and pendent, rarely short, flexible, nodulose near the tip, bearing at the apex few or numerous slender-pedicellate flowers; calyx 2–2.5 cm. long, costate; corolla green, 3.5–7 cm. long; fruits about 2 cm. long. A curious plant, attracting attention because of the dangling inflorescences of large, greenish flowers. In this respect it is much like the species of *Campanea* (Gesneriaceae) that grow in the same region.

Markea venosa Standl. & Morton, sp. nov.—Frutex epiphyticus; rami subquadrangulati albidi glaberrimi; folia saepe subopposita vel subverticillata, breviter petiolata, petiolo 4–7 mm. longo; lamina late elliptica, 3.5–7 cm. longa, 2–4 cm. lata, breviter acuminata, basi obtusa, subcoriacea, integra, glaberrima, venis supra obscuris, venis et venulis subtus elevatis reticulatis; inflorescentia terminalis, uniflora(?), pedicellis brevissimis; calyx 2–2.5 cm. longus, perspicue angulatus, segmentis liberis oblongis, ca. 1 cm. latis, cuspidato-subulatis, glabris; corolla albida, 5–5.5 cm. longa, anguste campanulata, tubo 1.7–2 cm. lato, limbo 2.5–3 cm. lato, lobis ca. 1 cm. longis, subaequalibus, integris; filamenta 9 mm. supra basin corollae affixa, ca. 1 cm. longa, basi glanduloso-pilosula; antherae anguste oblongae, 8 mm. longae; ovarium et stylus glabri.—Vara Blanca de Sarapiquí, Prov. Alajuela, alt. 1,770 meters, October 1937, *Skutch 3355* (type in U. S. Nat. Herb., No. 1,643,419). From *Markea leucantha* the present species differs strongly in calyx characters. In that species the calyx is not more than 13 mm. long, not angulate, and the lobes are united to the middle. The relative length of calyx and corolla is also different. In *M. leucantha*, moreover, the filaments are inserted low in the corolla tube (4 mm. above the base), are long-

pilose in the lower half, and are about 4 cm. long, thus placing the anthers near the throat. In *M. venosa* the filaments are short, the anthers being borne near the middle of the corolla tube. The calyx lobes of *M. venosa* are similar to those of *M. neurantha*, but that species has a very different inflorescence, a more broadly campanulate, wider-mouthed corolla, exserted stamens, and pubescent leaves and calyces. From both these species *M. venosa* may be distinguished by the leaves, which are markedly reticulate-venose beneath, with elevated veinlets. In *M. leucantha* and *M. neurantha* the veinlets are very obscure. *Markea venosa* is represented, apparently, also by an imperfect specimen in the Herbarium of Field Museum: Santo Domingo de Vara Blanca, 2,200 meters, *M. Valerio 1548*.

NICANDRA Adans.

Annual herbs, glabrous, branched; leaves alternate, membranaceous, petiolate, sinuate-dentate or repand-lobate; flowers large, pale blue, cernuous, solitary in the leaf axils, slender-pedicellate; calyx 5-parted, deeply 5-angulate, greatly enlarged in fruit, green, the segments connivent, cordate at the base; corolla broadly campanulate, plicate; filaments filiform, dilated below and pilose, the anthers oblong, dehiscent by longitudinal slits; fruit a nearly dry, globose berry, enclosed in the calyx.—The genus consists of one species.

Nicandra physalodes (L.) Gaertn. Occasional in waste or cultivated ground of the Meseta Central, and perhaps in other regions. Widely distributed in tropical America. Plants much branched, erect, a meter high or less; leaves ovate to oblong, acute at the base; flowers 2.5–3.5 cm. long; corolla limb almost entire; fruiting calyx 2.5–3.5 cm. long, the berry 1 cm. in diameter. The plant is apparently not frequent in Central America. In appearance it is much like *Physalis*, but the flowers are blue, rather than yellow.

NICOTIANA L. Tobacco

Herbs or shrubs; leaves alternate, entire or undulate, sessile or petiolate; flowers in terminal racemes or panicles; calyx tubular-campanulate or ovoid, 5-lobate; corolla tube commonly longer than the limb, the latter 5-lobate, with spreading lobes; filaments filiform, the anthers dehiscent by longitudinal slits; capsule 2-valvate or 4-valvate at the apex, containing numerous small seeds.—One or two species may be native in northern Central America.

Nicotiana Tabacum L. *Tabaco*. Tobacco is grown in considerable amounts from the temperate region to the coasts, for home

consumption and upon a larger scale for manufacture of cigars and cigarettes. The common tobacco is presumed to be native of the Andean region, since the closely related species are found wild there, but it was known to the aborigines before the Spanish invasion of the continent. Other native species also were utilized for smoking in various parts of America, but probably not in Central America. As indigenous names Pittier reports Dé-uá (Bribrí), Dá-uá (Cabécara), Dú-uó (Térraba), Tú-uá (Guatuso).

PETUNIA Juss.

Viscid herbs with branched stems; leaves entire; flowers small or large and showy, axillary or terminal, solitary; calyx deeply 5-lobate, with narrow segments; corolla funnelform or salverform, the limb plicate, spreading, slightly asymmetric; stamens 5, 4 of them didynamous and perfect, the fifth smaller or obsolete, the anthers ovoid; ovary 2-celled, the stigma bilamellate; capsule bivalvate, containing numerous small seeds.—The single native North American species occurs in Mexico, but probably does not reach Central America.

Petunia hybrida Hort. The common garden petunia, with variously colored, often variegated, sometimes double flowers is one of the most common garden and house plants of Costa Rica, as elsewhere in Central America. The cultivated plants are presumed to be of hybrid origin, derived from species native in southern South America, where the genus is best represented.

PHYSALIS L. Ground-cherry

Annual or perennial herbs or low shrubs; leaves petiolate, entire or sinuate-dentate or repand; flowers mostly small, solitary in the leaf axils, on slender pedicels; calyx campanulate, 5-dentate, in fruit inflated, with only a small opening at the apex, enclosing the fruit, membranaceous, somewhat 5-angled; corolla broadly campanulate or almost rotate, the tube very short, the limb plicate, angulate; anthers oblong, opening by longitudinal slits; fruit baccate, the numerous seeds reniform, compressed.—Several other species occur in Central America, and a few of them are to be expected in Costa Rica.

Physalis angulata L. Waste or cultivated ground of the tierra caliente, apparently infrequent. Widely distributed in tropical America. Plants annual, erect, less than a meter high, glabrous or nearly so; leaves usually ovate or elliptic and broadly cuneate at the base, coarsely dentate; corolla yellow, 5–10 mm. broad, with a

red-brown eye; fruiting calyx ovoid, 3 cm. long, not conspicuously angled, green or yellowish.

Physalis Lagascae Roem. & Schult. Pacific tierra caliente, and probably also in other regions. Widely distributed in tropical America. A much branched annual, finely pubescent or glabrate; leaves usually small, ovate, acute, obtuse or cordate at the base, somewhat sinuate-dentate, short-pilose, at least on the nerves; corolla small, greenish yellow, with a dark center; fruiting calyx only 1.5 cm. long, almost filled by the berry. Distinguishable from other local species by the very small fruiting calyx.

Physalis nicandroides Schlecht. Occasional as a weed about San José and elsewhere in the central region; region of Dota. Extending to Mexico. Plants annual, tall and coarse, much branched, conspicuously pubescent on the stems and leaves; leaves slender-petiolate, ovate to broadly elliptic, truncate to obtuse and very unequal at the base, coarsely dentate; fruiting calyx larger than in other species, broadly ovoid, cuspidate-acuminate, as much as 6 cm. long and 4 cm. broad, acutely angulate.

Physalis pubescens L. *Miltomate.* Occasional as a weed about the Meseta Central, extending to the coasts; region of San Ramón; Guanacaste. Generally distributed in tropical America. Plants annual, erect, branched, densely short-villous or pilose and more or less viscid; leaves broad, rounded to cordate at the base, repand-dentate; corolla 5–10 mm. broad, dull yellow with a purple-brown eye; fruiting calyx 2.5–3 cm. long, angulate, depressed at the base.

SARACHA Ruiz & Pavón

Mostly annual herbs, glabrous or pubescent, usually erect, branched; leaves petiolate, entire or sinuate-dentate; peduncles short, axillary, umbellately few-flowered, the pedicels commonly recurved; calyx broadly campanulate, shallowly 5-lobate, in fruit greatly enlarged, green, spreading, exposing the fruit; corolla broadly campanulate or subrotate, the limb broadly 5-lobate, plicate; filaments filiform, somewhat dilated and usually villous at the base, the anthers short, erect, the cells dehiscent by longitudinal slits; ovary 2-celled, the stigma emarginate or shortly bilamellate; fruit baccate, globose, containing numerous compressed seeds.—Probably no other species occur in Central America.

Saracha procumbens (Cav.) Ruiz & Pavón. *Jaltomate, Yerba de mora. S. umbellata* (Roth) Don; *S. Jaltomata* Schlecht. Occasional

in waste and cultivated ground, Meseta Central to the coasts; region of San Ramón; ascending to 1,750 meters. Widely distributed in tropical America. A branched herb a meter high or less, glabrous or nearly so; leaves long-petiolate, large, membranaceous, ovate to broadly elliptic, entire or sinuate-dentate, acuminate, acute at the base; corolla sulphur yellow or pale green, about 1 cm. broad; calyx in fruit 2 cm. or more in breadth; berries globose, purple-black, about 7 mm. in diameter.

SCHWENKIA L.

Annual or perennial herbs, usually slender, the leaves entire, ovate or narrower; peduncles 1–few-flowered, forming a leafy or naked panicle, the flowers greenish or whitish; calyx tubular or campanulate, 5-dentate or 5-lobate; corolla tube slender and elongate, not dilated in the throat, the limb small, plicate, the 5 primary lobes reduced to teeth, the appendages of the sinuses narrow and elongate, entire or variously bilobate; stamens exserted or included; anthers longitudinally dehiscent; fruit a small capsule.—A few other species are known from Central America. The commonest is *S. americana* L., which is to be expected in Costa Rica, on the Pacific slope.

Schwenkia browallioides HBK. Surubres, near San Mateo, in forest, *Biolley 7079*. Nicaragua to Venezuela. Plants apparently erect and branched, the stems puberulent; leaves slender-petiolate, ovate or lance-ovate, acuminate, entire, appressed-pilose, puberulent, or glabrate; flowers short-pedicellate, the narrow calyx 1 cm. long, the lobes linear-attenuate; corolla very slender, the tube 2 cm. long or more, the filiform appendages about 8 mm. long. The determination is slightly uncertain, and it may be that the Central American plant is really a distinct species.

SOLANDRA Swartz

Scandent shrubs, unarmed; leaves alternate, petiolate, entire; flowers very large and showy, terminal, solitary; calyx tubular or narrowly campanulate, 2–5-lobate; corolla funnelform, the throat dilated, the 5 lobes of the limb broad, spreading, imbricate; stamens declined, the filaments elongate, filiform, the anthers oblong; ovary 4-celled, the stigma bilamellate; fruit a large berry, containing numerous seeds.—No other species, probably, are found in Central America.

Solandra brachycalyx Kuntze, Rev. Gen. 2: 453. 1891. *Papaturra, Papamiel.* Volcán de Irazú, *Kuntze.* Slopes of Irazú, 1,800–2,500 meters. Endemic. A large, woody vine, apparently essentially

epiphytic, glabrous; leaves long-petiolate, ovate to rounded-elliptic, 15 cm. long, or less, abruptly short-acuminate, rounded to acute at the base; calyx 4–6 cm. long, the 2–3 lobes broad, apiculate; corolla yellow, about 20 cm. long. The fruits are described as globose or ovoid, and attaining a weight of 500–1,000 grams, sweet, and agreeable in flavor. I have never seen this plant growing, but it must be one of the showiest of all Costa Rican species, because of the huge flowers, which resemble in shape those of *Datura*. The Costa Rican species has been referred to *S. grandiflora* Swartz, of the West Indies, from which it is apparently quite distinct.

SOLANUM L.

Herbs, shrubs, or small trees, sometimes scandent, often armed with prickles, the pubescence frequently of branched hairs; leaves simple and entire or dentate, or often pinnate-lobate or pinnate; flowers small or large, umbellate, paniculate, or racemose; calyx campanulate or rotate, sometimes accrescent in age, 5-dentate or 5-lobate; corolla rotate, the limb plicate, 5-angulate or 5-lobate; filaments short, the anthers linear or oblong, connate or connivent to form a cone, the cells dehiscent by a terminal pore or sometimes by a short, terminal slit; ovary usually 2-celled; fruit baccate, commonly globose, the calyx persistent at its base or enclosing it.—A vast genus, with numerous additional species in Central America. The key here presented was prepared by Mr. Morton.

Key to species

A. Anthers blunt; plants unarmed (*Pachystemonum*).
  B. Leaves pinnate or pinnatifid.
    Inflorescences axillary (*Bassovia*).
      Leaf blades trifoliolate.....*S. phaseoloides.*
      Leaf blades 5–9-foliolate.
        Blades 5-foliolate.....*S. Pittieri.*
        Blades 7–9-foliolate.....*S. trizygum.*
    Inflorescences terminal or extra-axillary.
      Leaves partly simple, partly pinnatifid (*Jasminosolanum*).
        S. Seaforthianum.
      Leaves fully pinnate.
        Pedicels articulate above the base (*Hyperbasarthrum*).
          Plants woody vines.....*S. juglandifolium.*
          Plants erect herbs.

Fruits acute at the apex.....*S. longiconicum.*

Fruits rounded at the apex.....*S. tuberosum.*

Pedicels articulate at the base (*Basarthrum*).

Plants hirsute; leaf blades 3–7-foliolate... *S. Grossularia.*

Plants glabrate; leaf blades 9–11-foliolate..*S. suaveolens.*

B. Leaves entire, or sometimes sinuate-dentate in *S. nigrum.*

C. Pubescence of simple hairs or absent.

Plant a small vine creeping on tree trunks. Leaf blades oval, not over 4 cm. long; inflorescence racemose, extra-axillary, the rachis zigzag.....*S. evolvulifolium.*

Plants erect herbs, shrubs, or trees.

Inflorescences terminal or extra-axillary; plants herbaceous or rarely suffrutescent.

Corollas less than 1 cm. long; fruit small, globose (*Morella*).

Plants over 30 cm. high, glabrate or appressed-pubescent; umbels pedunculate, many-flowered. *S. nigrum.*

Plants less than 30 cm. high, long-hirsute; umbels sessile or rarely short-pedunculate, 1–3-flowered. *S. deflexum.*

Corollas over 1 cm. long; fruit ovoid, over 10 cm. long. *S. muricatum.*

Inflorescences terminal or opposite the leaves; plants shrubs or trees.

Inflorescences terminal. Leaf nerves bearded in the axils. *S. dotanum.*

Inflorescences opposite the leaves (*Leiodendron*).

Leaf blades pubescent on the mesophyll. *S. incomptum.*

Leaf blades not pubescent on the mesophyll, except sometimes along the midvein.

Lateral nerves barbate in the axils on the lower surface.....*S. parcebarbatum.*

Lateral nerves not barbate in the axils.

Inflorescences pedunculate, compound. Leaves solitary or, if geminate, the smaller not orbicular and stipule-like; corolla 1 cm. long; calyx lobes truncate, mucronate..*S. Brenesii.*

Inflorescences sessile or nearly so.

Smaller leaves rounded, orbicular, stipule-like. Calyx lobes acuminate, almost equaling the corolla.....*S. enchylozum.*

Smaller leaves acutish, more or less conform with the larger ones.

Leaves entirely glabrous.

Inflorescence 1-flowered, the pedicel very slender, over 1 cm. long; young stems minutely puberulous.....*S. pertenue.*

Inflorescence several- to many-flowered; stems glabrous, the epidermis often peeling off in scales.....*S. roblense.*

Leaf veins hairy beneath.

Stems and leaf veins rather long-pilosulous; leaves sessile or nearly so; inflorescences 1–3-flowered....*S. Valerianum.*

Stems and leaf veins very minutely puberulous; leaves petiolate; inflorescences several–many-flowered..*S. copeyanum.*

C. Pubescence of stellate hairs or scales.

Inflorescences axillary, 1- or rarely 2-flowered; calyx lobes circumscissile at the base.....*S. sanctae-claraе.*

Inflorescences terminal or extra-axillary.

Inflorescences extra-axillary (*Indubitaria*).

Leaf blades densely tomentose on both sides, the hairs long-stalked.....*S. extensum.*

Leaf blades sparingly scabrous, the hairs sessile or subsessile.....*S. Edwardsii.*

Inflorescences terminal (*Anthoresis*).

Corolla violet; plants of high elevations (2,400–3,000 meters).....*S. Storkii.*

Corolla white; plants of lower elevations.

Stems with long-stipitate, stellate hairs. Leaf blades attenuate at the base.....*S. umbellatum.*

Stems with short-stipitate or sessile hairs.

Calyx merely lightly toothed. Leaf blades green above, very pale beneath, short-petiolate.
S. salviifolium.

Calyx lobed one-third to one-half its length.

Leaf blades rounded at the base.

Stems soft-tomentose, with minutely but complexly branched hairs; calyx 4–5 mm. long; corolla 8–9 mm. long; leaves long-petiolate.

Leaves tomentose above... *S. verbascifolium.*

Leaves with a few scattered, stellate hairs above.

S. verbascifolium var. *adulterinum.*

Stems lepidote, the scales closely appressed, with a flat disk and numerous rays spreading in a single plane; calyx 2 mm. long; corolla 5 mm. long; leaves very short-petiolate.....*S. celsum.*

Leaf blades cuneate at the base. Ovary hairy at the apex; leaves sparingly stellate-scabrous beneath.....*S. rugosum.*

A. Anthers attenuate at the apex; plants prickly (*Leptostemonum*).

Leaves glabrous, the lower ones pinnate.....*S. Wendlandii.*

Leaves hirsute or stellate-pubescent.

Leaves deeply lobed, the divisions dentate .....*S. guanicense.*

Leaves entire or sinuate-lobed, the divisions entire.

D. Corolla lobed to near the base, the sinuses not plicate.

Pubescence partly or wholly of simple hairs; prickles straight; fruits 2–5 cm. in diameter (*Simplicipila*).

Calyx not aculeate; hairs all simple.....*S. mammosum.*

Calyx aculeate; hairs partly simple, partly stellate.

S. ciliatum.

Pubescence wholly of stellate hairs; prickles at least slightly recurved; fruits less than 2 cm. in diameter (*Juripeba*).

Ovary pubescent.

Pubescence of the ovary of simple hairs; calyx 8–14 mm. long, the lobes nerved, unequal, accrescent; pubescence of the stems ferruginous.

Stem appressed-pubescent, the hairs lacking a central ray; corolla white; erect shrub..*S. accrescens.*

Stem hirsute by the long, several-celled central rays of the hairs; corolla violet; scandent shrub.

S. rubidum.

Pubescence of the ovary of stellate hairs; calyx 3–4 mm. long (9 mm. in *S. mirabile*), the lobes equal, not nerved, not strongly accrescent; pubescence yellowish.

Calyx 3–4 mm. long, the lobes stellate-pubescent, aculeate; pedicels 1–1.5 mm. thick; hairs of the upper leaf surface sessile.

Hairs of the stem stipitate; hairs of the upper leaf surface with a long central ray. . . . *S. scabrum.*

Hairs of the stem sessile; hairs of the upper leaf surface without a long central ray. *S. lanceifolium.*

Calyx 9 mm. long, the lobes hispid with long bristles, these stellate at the apex, not aculeate; pedicels 3.5 mm. thick; hairs of the upper leaf surface long-stipitate. . . . . *S. mirabile.*

Ovary (and style) glabrous or stipitate-glandular.

Leaf blades sessile or nearly so, attenuate at the base. *S. jamaicense.*

Leaf blades petiolate, usually rounded at the base.

Hairs of the stems long-stipitate; calyx strongly aculeate; anthers 1 cm. long. . *S. Donnell-Smithii.*

Hairs of the stems short-stipitate or sessile; calyx unarmed or sparingly aculeate; anthers 5.5–7.5 mm. long.

Calyx truncate, with 5 subulate teeth; leaf blades 18–26 cm. long, 10–19 cm. wide, sinuate-lobed. . . . . *S. truncatum.*

Calyx lobed nearly to the middle, the lobes triangular; leaf blades not over 9 cm. long and 4 cm. wide, entire. . . . . *S. Hoffmannii.*

D. Corolla lobed to the middle or less deeply, the sinuses plicate. Pubescence stellate.

Berry long-hirsute; filaments connate to the apex. . *S. hirtum.*

Berry glabrous, or with a few stellate hairs at the apex in *S. laurifolium.*

Lowest flower only of the inflorescence fertile, this with a corolla 25–35 mm. long (*Andromonoecum*). *S. Melongena.*

Several flowers fertile, the corollas not over 20 mm. long (*Torvaria*).

Ovary stellate-pilose at the apex; pubescence of stems and lower leaf surface whitish; corolla violet. *S. laurifolium.*

Ovary glabrous or stipitate-glandular at the apex; pubescence yellowish or ferruginous; corolla white.

Stems hispid with coarse bristles, these stellate at the apex. . . . . *S. hispidum.*

Stems soft-tomentose or scabrous-tomentose.

Pedicels and calyx with some gland-tipped hairs.

Pedicels erect in fruit. . . . . *S. torvum.*

Pedicels recurved in fruit. . . . . *S. ferrugineum.*

Pedicels and calyx eglandular. *S. ochraceo-ferrugineum.*

Solanum accrescens Standl. & Morton, sp. nov.—Frutex erectus 1.5–3 m. altus; ramuli ferrugineo-pubescentes (pilis stellatis, subsessilibus, radiis patentibus 4–7, radio centrali nullo), parce aculeati, aculeis 3–7 mm. longis rubescentibus glabris basi latis apice paullo recurvis; folia solitaria, longe petiolata, petiolo 2–4 cm. longo; laminae elliptico-ovatae, majores 12.5–22 cm. longae et 8–11.5 cm. latae integrae acuminatae, basi rotundatae obliquae, costa interdum aculeatae, supra sparse stellato-scabridae, pilis stellatis sessilibus pauciradiatis, radio centrali nullo, subtus stellato-pubescentes, pilis tenuibus, sessilibus vel substipitatis; inflorescentia extra-axillaris, 3–5-flora, pedunculo 1–3 cm. longo, pedicellis ca. 4 mm. longis; calycis tubus 1.5 mm. longus, angulatus, stellato-pubescens, lobis lanceolatis acuminatis trinerviis, extus parce stellato-scabridis, intus basi stipitato-glandulosis, sursum stellato-pubescentibus, inaequalibus, 4 minoribus 10–11 mm. longis, 4 mm. latis, quinto ca. 14 mm. longo; corolla alba, 13.5–16 mm. longa, tubo 2.5 mm. longo, lobis lineari-lanceolatis, acutis, extus pubescentibus, sinu non plicato; filamenta 1 mm. longa, libera, glabra, basi ampliata, antheris aequalibus, 8 mm. longis, attenuatis, poris terminalibus parvis; ovarium simpliciter pilosulum, stylo quam antheris longiore, pilosulo; pedicelli fructiferi ca. 8 mm. longi, crassi, ca. 2 mm. diam.; calycis lobi accrescentes, segmentis minoribus usque ad 18 mm. longis et 7 mm. latis, quinto 10 mm. lato, valde nervoso; bacca viridis globosa, 13–15 mm. diam., persistente simpliciter pilosa; semina reniformia, ca. 3 mm. longa, 4 mm. lata, 1 mm. crassa, rubescentia.—El General,

Prov. San José, December, 1936, alt. 1,130 meters, *Skutch 2979* (type in the U. S. Nat. Herb., No. 1,643,053). Los Ayotes, Guanacaste, 600–700 meters, *Standley & Valerio 45508*. Tilarán, Guanacaste, 500–600 meters, *Standley & Valerio 44335*. Distinguished from *S. rubidum* by the closely appressed pubescence of the stems and upper leaf surfaces, due to the absence of a central ray in the stellate hairs. The calyx lobes are also larger and more prominently 3-nerved. The corolla is white rather than violet. The plants are small shrubs, whereas *S. rubidum* is said by the collector to be arborescent but with stems like a liana. The species is represented in the Herbarium of Field Museum by one other collection: Forests of La Palma de San Ramón, 1,100 meters, *Brenes 5134*.

Solanum Brenesii Morton & Standl., sp. nov.—Frutex vel arbuscula vulgo 1–2-metralis, interdum 4.5 m. alta, trunco ad 10 cm. diam., fere omnino glabra, ramis crassiusculis subteretibus in sicco saepe fuscescentibus, internodiis brevibus vel subelongatis; folia magna alterna solitaria breviter petiolata membranacea vel subcoriacea, petiolo crasso plerumque 2–3 cm. longo superne marginato; lamina valde variabilis oblongo-elliptica, oblongo-obovata vel anguste oblanceolato-oblonga, vulgo 13–26 cm. longa atque 6–12 cm. lata breviter acuminata, basi acuta vel basin versus cuneato-attenuata, supra in sicco viridis, venis saepe subimpressis, subtus paullo pallidior brunnescens, interdum ad nervos sparse pilosula, costa gracili elevata, nervis lateralibus utroque latere ca. 10 subarcuatis obliquis angulo latiusculo adscendentibus, venis prominentibus laxe reticulatis; inflorescentiae oppositifoliae vel infra-axillares umbelliformes plerumque 5–15-florae densae 1–2 cm. longe pedunculatae suberectae vel patentes, pedicellis superne subincrassatis in statu florifero ca. 5 mm. longis, in statu fructifero valde incrassatis et usque 12 mm. longis; calyx campanulatus extus minute puberulus 2–2.5 mm. longus ad medium 5-lobus, lobis latis semiorbicularibus latioribus quam longis apice subtruncatis; corolla alba rotata extus intusque glabra profunde 5-lobata, lobis oblongo-ovatis; antherae fere 4 mm. longae; baccae globosae 1.5 cm. diam. apice late rotundatae.—San Juan, cerca de San Ramón, January, 1933, *Brenes 16859* (type in Herb. Field Mus.). La Palma de San Ramón, *Brenes 6261*. San Pedro de San Ramón, bosque de La Catarata, *Brenes 21435*, *21434*. Bosque de Río Nuevo, cerca de Puerto Jiménez de Osa, 10–15 meters, *Brenes 13204*. Zarcero, 1,950 meters, *Austin Smith H140, 4110*. Camino cerca de La Laguna del Arenal, Guanacaste, 600 meters, *Brenes 12656*. Piedades Norte y Los Angeles de San

Ramón, *Brenes 6723*. Northeast of San Ramón, *Brenes 15012*. Orillas del Río Nuevo cerca de Puerto Jiménez de Osa, 15–20 meters, *Brenes 12214*. Río Barranca, near San Juan de San Ramón, 1,500–1,600 meters, *Tonduz 17688*. Hacienda Quebrada Azul, lower slopes of Volcán Tenorio, 400–600 meters, *C. W. Dodge 6185*. La Tejona, north of Tilarán, Guanacaste, 600 meters, *Standley & Valerio 45910*. Cerros de Zurquí, 2,000–2,400 meters, *Standley & Valerio 50253*. Cerro de La Carpintera, 1,500–1,800 meters, *Standley 35732*. San Ramón, *Tonduz 17696*. Tilarán, *Standley & Valerio 46636, 44495*. The plant is a somewhat variable one, but all the material is without doubt referable to a single species. Some of the specimens, with very narrow leaves, represent a form that might be considered worthy of varietal rank, but the presence of intermediate forms makes such a segregation of doubtful value.

Solanum celsum Standl. & Morton, sp. nov.—Frutex 6 m. altus; rami subteretes, flavido-lepidoti, squamis disciformibus minutis spissis, margine multiradiatis; folia geminata inaequalia, breviter petiolata, petiolo vix 1 cm. longo; lamina foliorum majorum oblonga, 16–19 cm. longa, 6.5–7.5 cm. lata, longe acuminata, basi rotundata, membranacea, integra, supra viridis, subtus minutissime sublepidota; folia minora elliptica, 5.5–7 cm. longa, obtusiuscula; inflorescentia suboppositifolia, ca. 9 cm. longa, longe pedunculata, pedunculo communi 5 cm. longo, flavido-lepidoto, sursum pluries dichotomo-ramoso, pedicellis 5–7 mm. longis; calyx 2 mm. longus, ad medium lobatus, extus parce lepidotus, lobis obtusis; corolla purpurascenti-alba, 5 mm. longa, stellata, tubo 1 mm. longo, lobis 4 mm. longis; filamenta brevia glabra; antherae oblongae, 2 mm. longae; ovarium apice pilos paucos stellatos gerens; stylus basi parce stellato-pilosus.—El General, Prov. San José, alt. 950 meters, January, 1936, *Skutch 2364* (type in U. S. Nat. Herb., No. 1,642,351). The present species belongs to the section *Lepidotum*, no species of which has been known from North America. From other Costa Rican species of *Solanum* it may be distinguished by the character of the hairs of the stems and inflorescence, and to a lesser extent of the leaves. The hairs are sessile, and under a lens are seen to have an obvious disk, with many rays radiating from the margin in a simple plane. In addition, *S. celsum* differs from *S. rugosum*, *S. umbellatum*, and *S. bicolor* in the rounded leaf bases, and from *S. verbascifolium* in the very short petioles.

Solanum Cervantesii var. *erythrocarpum* Kuntze, Rev. Gen. 2: 454. 1891. Type collected by Kuntze on Volcán de Irazú, at 2,800

meters. The identity of the plant is uncertain. It may be the one here called *S. Storkii.*

Solanum ciliatum Lam. Jacq. *Berengena, Rabo de chancho, Huevos de perro.* Frequent in forests or in waste ground of the central region, extending to the upper part of the Atlantic tierra caliente, mostly at 600–1,800 meters; Zarcero. Widely distributed in the tropics of both hemispheres. Plants herbaceous or suffrutescent, 2.5 meters high or less, somewhat pilose or almost glabrous, the branches densely covered with very long, straight, yellow prickles; leaves long-petiolate, membranaceous, thin and lax, broadly ovate, pinnate-lobate or repand, bearing long, yellow prickles on both surfaces; flowers in few-flowered, pedunculate, lateral cymes; calyx densely prickly and bearing a few long, weak hairs, not accrescent; corolla white to pale yellow, about 12 mm. broad; berries globose, red, mostly 2–3 cm. in diameter. The plant is common in some places about San José and Cartago. It is most offensively armed with long, yellow prickles, but is rather handsome when covered with the large, bright red fruits. Costa Rican material, as well as that from elsewhere in Central America and from Mexico, has been referred generally to *S. aculeatissimum* Jacq., of which no Costa Rican specimens have been seen. The two species are most easily separated (see Bitter, Repert. Sp. Nov. Beih. 16: 147. 1923) by their seeds. Those of *S. ciliatum* are 4.5–5 mm. wide and broadly winged, those of *S. aculeatissimum* only 2–2.5 mm. wide and not at all winged. There are also accompanying differences in foliage, especially pubescence, which apparently distinguish the two plants easily in the flowering stage.

Solanum copeyanum Bitter, Repert. Sp. Nov. 18: 54. 1922. Forests of Copey, 1,800 meters, *Tonduz 11689* (photo. and fragment of type seen, ex herb. Berlin). Apparently frequent in forests of the region of Dota, 1,500–2,100 meters; widely distributed in forests of the central region, at middle elevations; Nicoya. Endemic. A shrub a meter high, or sometimes a tree of 7 meters, unarmed, the branches slender, minutely pilose or glabrate; leaves often geminate or subgeminate, those of a pair very unequal, short-petiolate, the larger blades lanceolate or oblong-lanceolate, mostly 12–16 cm. long and 3.5–5 cm. wide, long-attenuate at the apex, acute at the base and more or less decurrent, entire, minutely pilose above on the costa, elsewhere glabrous, beneath minutely puberulous on the nerves and veins or sometimes glabrous; inflorescences lateral, opposite the leaves, subumbelliform, 10–14-flowered, short-pedunculate, the

pedicels 9–10 mm. long; calyx 1.5–2.5 mm. long, deeply lobate, the lobes elliptic, obtuse, papillose-pilose at the apex; corolla white, 1.5 cm. broad, glabrous outside; berries about 7 mm. in diameter. The plant is somewhat variable as to pubescence, of which it has at best but a very scant amount. As indicated by material in the Herbarium of Field Museum, Bitter originally considered the two collections that he cites (*Tonduz 11689* and *11723*, both from Copey) to represent two distinct species, although it is hard to see upon what differences two species might be distinguished.

Solanum deflexum Greenm. La Balsa del Río Grande, Prov. Alajuela, *Pittier 3646*. Ranging northward to Mexico. A slender, erect annual, usually 30 cm. high or less, simple or often much branched, the stems pilose with slender, pale, mostly spreading hairs; leaves small, slender-petiolate, broadly ovate to lance-ovate, acute or acuminate, rounded to acute at the base and often short-decurrent, entire, white-pilose; inflorescences extra-axillary, umbelliform, few-flowered, sessile or nearly so, the slender pedicels elongate, deflexed in fruit; calyx small, green, deeply lobate, the lobes narrow, hispidulous; corolla white, about 6 mm. long; berries globose, about 8 mm. in diameter, glabrous.

Solanum Donnell-Smithii Coulter. Occasional in thickets of the tierra caliente and sometimes at higher elevations, ascending to 1,500 meters; El General. Extending to southern Mexico. A small or large vine, the branches densely covered with mostly long-stipitate, stellate hairs, densely armed with short, strongly recurved, yellowish prickles; leaves short-petiolate, oblong to ovate, mostly 8–15 cm. long, acute, usually obtuse at the base, entire or nearly so, hispid or stellate-hispidulous above, covered beneath with chiefly stipitate, stellate hairs, usually armed with prickles beneath; inflorescences infra-axillary, racemose, short and few-flowered, the flowers pedicellate; calyx stellate-hispid and often prickly; corolla white, 1.5 cm. long or less, deeply lobate; fruit glabrous, almost 1 cm. in diameter. Easily recognized by the vinelike habit, numerous short, recurved prickles, and stipitate, stellate hairs.

Solanum dotanum Morton & Standl., sp. nov.—Frutex 2–3-metralis, ramulis obtuse angulatis inermibus glaberrimis, internodiis brevibus; folia alterna solitaria, omnia conformia, breviter petiolata in sicco crasse membranacea et saepe fusca, petiolo crassiusculo 10–15 mm. longo glabro; lamina anguste lanceolato-oblonga 10–18 cm. longa 2.5–4 cm. lata, medio latissima, sensim acuminata, basi plus minusve inaequali acuta vel longiacuminata, integra, supra

sublucida glabra, venis subimpressis, subtus fere concolor, in axillis nervorum densissime breviter albido-barbata, aliter glabra, costa gracili elevata, nervis lateralibus utroque latere ca. 13 prominentibus gracilibus valde curvis angulo lato fere recto adscendentibus, venis laxe reticulatis vix prominulis; inflorescentiae umbelliformes, vulgo apice rami racemosae vel subpaniculatae, sessiles vel pedunculatae, floribus numerosis, pedicellis gracilibus curvis in statu fructifero paullo crassioribus 7–23 mm. longis minute pilosulis vel glabratis; calyx campanulatus 4 mm. longus glaber fere ad medium lobatus, lobis elliptico-ovatis obtusis erectis; corolla alba ca. 8 mm. longa fere ad basin lobata, lobis lanceolato-oblongis apicem versus sensim attenuatis extus ad margines breviter villosulis; antherae extus glabrae 4 mm. longae; fructus immaturus ca. 8 mm. diam. glaber, apice late rotundatus.—(All the collections are from the region of Dota, Prov. San José) Laguna de La Chonta, northeast of Santa María de Dota, 2,000 meters, wet thicket, *Standley 42265* (type in U. S. Nat. Herb.; photo. in Herb. Field Mus.). El Copey, 1,800 meters, *Tonduz 11928*. Camino nuevo de La Estrella a Copey, 2,450 meters or less, *M. Valerio 1049*. Near Finca La Cima, above Los Lotes, north of El Copey, 2,100–2,400 meters, moist thicket, *Standley 42764*.

Solanum Edwardsii Standl. Vara Blanca de Sarapiquí; La Estrella, Prov. Cartago; Orosi, Prov. Cartago; chiefly at 1,400–1,750 meters. Honduras. A shrub of 1.5–2.5 meters, sometimes subscandent, unarmed; branches densely stellate-tomentose with sessile or short-stipitate hairs; leaves thin, on short petioles, mostly solitary, oblong-ovate or lance-oblong, narrowly long-acuminate, rounded or obtuse and very oblique at the base, stellate-pilosulous above, densely stellate-pilose beneath, entire; umbels supra-axillary, sessile or pedunculate, mostly 2–4-flowered, the slender pedicels elongate; calyx lobed almost to the base, the lobes oblong or broadly oblong, 5–6 mm. long, accrescent after anthesis, obtuse or rounded at the apex; corolla white; berry globose, glabrous, 7–8 mm. in diameter.

Solanum enchylozum Bitter, Repert. Sp. Nov. 18: 64. 1922. Forests of Shirores, Talamanca, 100 meters, *Pittier & Tonduz 9193*. Plants unarmed, suffrutescent(?), the branches glabrous; upper leaves subgeminate, those of a pair very unequal, the larger ones on petioles 8–12 mm. long, broadly oblong-lanceolate, 21–22 cm. long, 7.5–9.5 cm. wide, cuneately narrowed to each end, broadest at or slightly below the middle, glabrous; inflorescences opposite the

leaves, sessile, about 6-flowered, the pedicels 5–6 mm. long, almost glabrous; calyx 1.5–2 mm. long, the short lobes triangular, acute or acuminate; corolla 8 mm. broad, glabrous outside; anthers 2 mm. long; ovary glabrous. To this species perhaps belongs *Standley 39854* from Orosi, Prov. Cartago. In this the leaves are rounded at the very base, and they are slightly puberulous beneath on the veins.

Solanum evolvulifolium Greenm. ex Donn. Smith, Bot. Gaz. 37: 211. 1904. La Palma, Prov. San José, 1,460 meters, *Pittier 7413*. Frequent in forests of the central region; region of San Ramón; mostly at 1,100–1,600 meters. Endemic. Plants herbaceous or suffrutescent, usually epiphytic, pendent or subscandent, unarmed, pubescent with short, incurved hairs; leaves short-petiolate, oblong-ovate or oblong-lanceolate, 1.5–3.5 cm. long, acute or acuminate, rounded or cordate at the base, entire, glabrous above, pilosulous beneath on the costa and nerves; inflorescences small and few-flowered; calyx 3–4 mm. long, shallowly 5-lobate; corolla white, 12 mm. long; berries ovoid or subglobose, 7–14 mm. long.

Solanum extensum Bitter. Thickets and hedges, region of San Ramón, and doubtless elsewhere. Panama. An unarmed shrub of 2–3 meters, the branches slender, often long and pendent or subscandent, densely stellate-tomentose; leaves short-petiolate, ovate to oblong-lanceolate, 5–11 cm. long, narrowly long-acuminate, obtuse or rounded and often very unequal at the base, entire, thinly stellate-hirtellous above, green, densely stellate-tomentose beneath; flowers umbellate, the umbels few- or many-flowered, inserted below the axils, sessile, the flowers long-pedicellate, white; calyx in flower 6 mm. long, greatly accrescent in fruit and spreading, lobed almost to the base, the lobes ovate to elliptic, acute or short-acuminate; corolla little longer than the calyx; berries globose, glabrous, lustrous, about 8 mm. in diameter.

Solanum ferrugineum Jacq. *Berengena espinuda. S. madrense* Fernald. Region of San José, in thickets; Nicoya; and doubtless elsewhere. Mexico to northern South America. An erect shrub, the branches densely fulvous-tomentose with short-stipitate, stellate hairs, armed with numerous short, stout, straight or slightly recurved prickles; leaves large, petiolate, ovate or broadly ovate, 12–18 cm. long, or often shorter, acute or obtuse, usually subcordate at the base, subentire to sinuate-lobate, rough on the upper surface and stellate-hispidulous, paler beneath, softly and densely stellate-tomentose, unarmed; inflorescences lateral, subracemose, with few or numerous flowers, the flowers pedicellate, the pedicels recurved in fruit; calyx

densely stellate-tomentose, the lobes narrow, lance-subulate; corolla white, 1.5–2 cm. long; fruit yellow, 1–1.5 cm. in diameter, glabrous.

Solanum Grossularia Bitter, Repert. Sp. Nov. 10: 537. 1912. *Chiverrillo.* Origin of the type material uncertain, but probably collected in Costa Rica by Wercklé. Frequent in forests of the central region, chiefly at 1,100–1,800 meters; region of San Ramón. Guatemala; a variety is described by Bitter from Colombia. Plants herbaceous, unarmed, weak, procumbent or suberect, sometimes subscandent, densely pilose with stiff, whitish, unequal hairs; leaves with pseudostipules at the base of the petiole, pinnate, the leaflets 5–7, petiolulate, lance-ovate or ovate, entire, acute, densely pilose on both surfaces; inflorescences slender-pedunculate, raceme-like, few-flowered, the pedicels slender, 12–13 mm. long or more; calyx 5-parted, the lobes lanceolate, acute; corolla white, 1.5 cm. broad, pilose outside; fruits ovoid or subglobose, about 2 cm. long. The specimens show so much variation in pubescence that possibly two species are represented by the material referred here.

Solanum guanicense Urban. Region of Nicoya, along roadsides, and perhaps elsewhere. Panama to British Honduras and West Indies. Plants annual, low, branched, abundantly armed on the stems, leaves, and calyces with long, slender, yellowish, straight prickles, the stems densely covered with very unequal, stellate, sessile or stipitate hairs; leaves petiolate, cordate at the base, broad, deeply pinnate-lobate with 3–4 lobes on each side, the lobes serrate-dentate, stellate-pilose above, stellate-tomentose beneath; inflorescences extra-axillary, 1–2-flowered, pedunculate, the flowers slender-pediceled; calyx 5–7 mm. long, the lobes aculeate, narrowly lanceolate, long-acuminate; corolla pale blue or whitish, 1 cm. long, stellate-pilose outside; berries partly enclosed in the accrescent calyces, globose, 1–1.5 cm. in diameter, yellowish. Bitter has indicated Costa Rican material of this species in the Berlin herbarium as representing a new variety, so far unpublished.

Solanum hirtum Vahl. Occasional in thickets or waste ground, Meseta Central and doubtless also in the Pacific tierra caliente; region of San Ramón. Widely distributed in tropical America. A shrub, usually about a meter high, bushy-branched, the branches and petioles densely tomentose with long, soft hairs that are branched at the apex, the stems densely armed with long, straight, yellow prickles; leaves large and soft, sparsely prickly, broadly ovate to suborbicular, acute or obtuse, cordate at the base, shallowly sinuate-lobate, densely tomentose beneath; inflorescences lateral, few-

flowered; calyx 1 cm. long, deeply lobate; corolla white, 1.5 cm. long; fruit globose, about 2 cm. in diameter, yellow or orange, densely covered with very long, soft, spreading hairs. A frequent weedy plant in many parts of Central America.

Solanum hispidum Pers. Thickets of the central region, chiefly at 1,300–2,000 meters. Extending to Mexico, and perhaps also southward. A shrub or tree, 1.5–3 meters high, the branches armed abundantly with stout, rather short, straight prickles, rather densely covered with coarse, spreading hairs, these brownish or rufous, stellately branched at the apex; leaves large, rough, obtuse to subcordate at the base, entire or rather deeply lobate, often prickly on the costa, densely stellate-tomentose, especially beneath, the hairs at least in part stipitate; corolla white or whitish, 12–15 mm. long; fruit 1–1.5 cm. in diameter.

Solanum Hoffmannii Bitter in herb., sp. nov.—Frutex plus minusve scandens, ramis teretibus pilis sessilibus stellatis cinereis vel subfulvis brevibus sat dense obtectis, aculeis ca. 2 mm. longis lutescentibus basi valde dilatatis compressis recurvis dense armatis; folia plerumque binata petiolata conformia subcoriacea, petiolo usque 2 cm. longo saepe multo breviore dense stellato-tomentoso atque recurvo-aculeato; lamina lanceolata vel lanceolato-oblonga, interdum oblongo-ovata 3–8 cm. longa 1.5–2.5 cm. lata acuta vel acuminata, basi acuta atque subdecurrens, supra sparse pilis stellatis sessilibus parvis conspersa vel fere glabra, subtus densissime pilis fulvis stellato-tomentosa, saepe subtus ad costam prominentem recurvo-aculeolata; inflorescentiae extra-axillares racemiformes, floribus 5 vel pluribus graciliter pedicellatis, pedicellis fructiferis usque 14 mm. longis erectis dense pilis eglandulosis stellato-tomentosis; calyx turbinato-campanulatus ca. 3 mm. longus dense stellato-tomentosus, ad medium 5-lobus, lobis triangularibus acutis; corolla alba extus minute stellato-tomentosa fere 1 cm. longa fere ad basin 5-loba, lobis lanceolato-linearibus attenuatis; antherae 5–6 mm. longae; ovarium glabrum; baccae globosae aurantiacae vel subrubrae in sicco lucidae ca. 8 mm. diam.—Costa Rica, without definite locality, *Hoffmann 476* (type in Herb. Field Mus.; duplicate in herb. Berol.). One mile west of Cartago, 1,410 meters, *Stork 2871*. San José, 1,160 meters, *M. Valerio 155*. Colinas de San Pedro de San Ramón, *Brenes 17521*. Los Angeles de San Ramón, *Brenes 6154*. The species has been confused with *S. lanceifolium*, from which it is abundantly distinct. It is rather common, apparently, in the central region, at middle elevations.

Solanum incomptum Bitter, Repert. Sp. Nov. 18: 60. 1922. *S. incomptum* var. *longipilosum* Bitter, op. cit. 61 (La Verbena, near Alajuelita, *Tonduz 9096*). *S. incomptum* var. *lugens* Bitter, loc. cit. (valley of Río Poás, 2,100 meters, *Pittier 2396*). Llanos de Alajuelita, *Tonduz 1468*. Reported also from El General. Endemic. A shrub, unarmed, the young branches short-pilose, soon glabrate; leaves subgeminate, those of a pair very unequal, the larger ones on petioles 1–2 cm. long, oblong-lanceolate or obovate-lanceolate, 7–12 cm. long, 3.5–4.5 cm. wide, usually widest above the middle, narrowed to the subobtuse apex, cuneately long-attenuate to the base, entire, sparsely short-pilose above, at least on the nerves, paler beneath, short-pilose, especially along the costa; inflorescences small, opposite the leaves, subracemose, 10–20-flowered, the pedicels 7 mm. long, pilose, especially above; calyx campanulate, 2 mm. long, the 5 lobes ovate, obtuse, pilose outside; corolla 11 mm. broad; ovary glabrous.

Solanum jamaicense Mill. Pejivalle, Talamanca, Tucurrique; probably common throughout the Atlantic tierra caliente. Widely distributed in tropical America. A shrub with recurved or often subscandent branches, abundantly armed with stout, recurved prickles, the branches stellate-tomentose; leaves sessile or nearly so, in texture resembling flannel, oblong-lanceolate to elliptic, more or less diamond-shaped, long-acuminate, cuneate at the base and decurrent, angulate-lobate or subentire, densely stellate-tomentose on both surfaces; flowers in sessile or subsessile umbels, slender-pedicellate; calyx 4 mm. long, the linear lobes recurved; corolla white, 10–15 mm. broad; berries globose, bright red, lustrous, 5 mm. in diameter. A common shrub in second-growth in many parts of the Central American tierra caliente.

Solanum juglandifolium Dunal, var. **Oerstedii** Bitter, Repert. Sp. Nov. 11: 461. 1912. Type *Oersted 1465*, probably Costa Rican, but the locality not indicated (photo. seen of type, ex hb. Berol.). The species and its varieties occur in Colombia and Ecuador. Plants herbaceous or suffrutescent, probably scandent, unarmed, the branches and pedicels stipitate-glandular and long-pilose; leaves without pseudostipules, pinnate, the leaflets 7, with very small ones usually interposed, slender-petiolulate, ovate-oblong or lance-oblong, the larger ones about 10 cm. long and 3.5 cm. wide, acute or acuminate, rounded and unequal at the base, scabrous above, rather densely villous beneath; inflorescence lax and open, long-pedunculate, many-flowered, the flowers long-pedicellate, the pedicels articulate below

the middle; calyx lobes 6 mm. long; corolla almost 3 cm. broad, probably white.

Solanum lanceifolium Jacq. Frequent in thickets of the tierra caliente. Mexico to West Indies and northern South America. A small or large, scandent shrub, densely or sparsely covered with sessile, stellate hairs, armed with few or numerous recurved prickles 1–2 mm. long; leaves petiolate, the petioles aculeolate, the blades ovate or oblong-elliptic, 5–15 cm. long, acute or obtuse, subacute to rounded at the base, entire or shallowly sinuate-lobate, sparsely stellate-hispidulous and green above, more densely stellate-hispidulous beneath and paler, usually prickly along the costa; inflorescences lateral, raceme-like, few-flowered, the pedicels 10–12 mm. long; calyx 3–3.5 mm. long, stellate-hirsute, the lobes acuminate; corolla white, 9–12 mm. long, deeply lobate, the lobes oblong-lanceolate, stellate-hirsute outside; ovary pilosulous at the apex; berries globose, 6–9 mm. in diameter, red, lustrous.

Solanum laurifolium Mill. *Berengena. S. Hartwegii* Benth.; ?*S. glutinosum* var. *irazuense* Kuntze, Rev. Gen. 2: 454. 1891 (Volcán de Irazú, at 2,800 meters, *Kuntze*). Frequent in thickets and hedges in the region of Cartago, also about San José, and on the slopes of Irazú; region of San Ramón; mostly at 1,100–1,500 meters. Extending to Mexico and West Indies. An erect shrub of 1–3.5 meters, sparsely armed with short prickles, or many of the branches often unarmed, stellate-tomentose with mostly whitish hairs; leaves short-petiolate, chiefly oblong-elliptic, entire or repand-undulate, acute or obtuse, acute to rounded at the base, rather rough above and coarsely stellate-pilose, often pale beneath and very densely tomentose with coarse, stellate hairs; inflorescence extra-axillary, corymbiform, small but many-flowered, short-pedunculate, the flowers short-pedicellate; calyx 5 mm. long, stellate-tomentose, deeply lobate, the lobes linear, acuminate; corolla blue, 1.5 cm. long, stellate-tomentose outside; berries 6–8 mm. in diameter, globose, sparsely stellate-tomentose or glabrate. *Hoffmann 104* from Irazú in the Berlin herbarium, evidently referable to this species, has been indicated by Bitter as a new species, still unpublished. The proper specific name to be used for this Costa Rican plant is a matter of uncertainty.

Solanum longiconicum Bitter, Repert. Sp. Nov. 10: 534. 1912. *Papayillo.* La Palma del Irazú, 1,800 meters, *Wercklé 65* (photo. of type seen, ex herb. Berol.). Frequent in forests of the central region, chiefly at 1,800–3,000 meters. Endemic. Plants branched, herbaceous, unarmed, weak and decumbent or suberect, the stems glabrous

or nearly so, the roots often bearing small, potato-like tubercles; pseudostipules present at the base of the petiole; leaves pinnate, long-petiolate, usually 7, without interposed smaller leaflets, short-petiolulate, lanceolate to oblong-ovate, 5–6.5 cm. long, acute or acuminate, entire or nearly so, sparsely pilose or beneath almost glabrous; inflorescence many-flowered, lax, long-pedunculate, the pedicels mostly 16–18 mm. long, articulate above the middle, short-pilose; calyx in anthesis 5 mm. long, the lobes short, acuminate, short-pilose outside; corolla white or violaceous, almost 2 cm. broad; fruits long-conic, about 2 cm. long and scarcely half as thick. *Solanum verrucosum* Schlecht., a Mexican species, was reported by Rydberg (Bull. Torrey Club 51: 153. 1924) from Volcán de Irazú, on the basis of *Popenoe 1015*. Examination of the specimen cited shows that it is actually referable to *S. longiconicum*.

Solanum mammosum L. *Pichichío, Pichichinchivo.* Thickets, savannas, and pastures of the tierra caliente; Guanacaste; often found as a weed about settlements in the Meseta Central, at least on the Pacific slope. Widely distributed in tropical America. Plants herbaceous or suffrutescent, 1.5 meters high or less, bushy-branched, armed on the stems and leaves with very long, yellowish, straight, compressed prickles, the stems densely covered with very long, soft, multicellular hairs; leaves mostly 10–15 cm. long, petiolate, broad, irregularly lobate, usually cordate at the base, densely long-pilose; inflorescences umbelliform, lateral, few-flowered; calyx unarmed; corolla violaceous, 2 cm. long; fruit 3–5 cm. in diameter, bright yellow, abruptly contracted above into a short neck, depressed at the base and somewhat 5-angulate, with rounded angles. A well known plant in the Central American tierra caliente, where it is much used in domestic medicine. In Costa Rica a decoction of the leaves is employed in treating affections of the kidneys and bladder. The fruit, however, is reputed to be highly poisonous. Pittier reports the Cabécara name as Terós-ue.

Solanum Melongena L. *Berengena. Eggplant.* A plant of Asiatic origin, sometimes grown in Costa Rica for its very large, dark purple fruits, of various shapes, which are used as a vegetable. Although the eggplant seems to do well in cultivation in Central America, it is grown but little, and is evidently a far less popular vegetable than in the United States.

Solanum mirabile Standl. & Morton, sp. nov.—Frutex; ramuli crassi, ca. 6 mm. diam., dense hispido-tomentosi (pilis ferrugineis setiformibus apice radiatis, radio centrali nullo), parce aculeati,

aculeis minutis, vix 2 mm. longis, recurvis; folia solitaria vel subgeminata, breviter petiolata, petiolo 0.5–1.8 cm. longo, crasso, ca. 3.5 mm. diam., dense stellato-hispido, aculeato; laminae lanceolatae, 11–16.5 cm. longae, 4–7 cm. latae, acuminatae, basi rotundatae obliquae, integrae, supra stellato-hispidae (pilis longe stipitatis, radiis adscendentibus), non aculeatae, subtus densius stellato-pubescentes; inflorescentia extra-axillaris, non aculeata, pedunculo 3.5–4 cm. longo, 3.5–4 mm. crasso, dense stellato-hispido, paucifloro, pedicellis 5–7 mm. longis, 3.5 mm. crassis, dense stellato-hispidis; calyx ca. 9 mm. longus, tubo brevi, lobis linearibus, extus longe hispidis, pilis setiformibus apice stellato-radiatis; corolla ca. 15 mm. longa, tubo brevissimo, lobis lineari-lanceolatis, extus dense hispidis, intus glabris, sinu non plicato; filamenta brevissima, ad apicem connata; antherae crassae, ca. 9 mm. longae; ovarium dense stellato-tomentosum.—Las Vueltas, Prov. Cartago, January, 1899, alt. 635 meters, *Tonduz 13049* (type in U. S. Nat. Herb., No. 1,324,808). Not closely related to any other Costa Rican species. *S. Donnell-Smithii* differs in its glabrous ovary, aculeate inflorescence, and less dense pubescence of stems and foliage. In *S. Donnell-Smithii* the stellate hairs of the upper leaf surface are sessile, and bear an erect central ray. These hairs in *S. crassipes* are long-stipitate and lack a central ray.

Solanum muricatum Ait. *Pepino mango, Manguena.* Cultivated occasionally in the temperate and cold regions for its edible fruit. Believed to be native in the Andes, but perhaps known only in cultivation. A bushy, unarmed herb, usually a meter high or less, the branches glabrous or nearly so; leaves oblong-lanceolate to ovate, acute or obtuse, attenuate to the base, entire or nearly so, petiolate, sparsely soft-pilose; flowers bright blue; fruit ovoid, pendent, 10–15 cm. long, green or yellow with longitudinal, purple stripes, the flesh yellow. Fruits of cultivated plants are usually seedless. The green fruits are cooked and eaten, the ripe ones eaten raw.

Solanum nigrum L. *Yerbamora.* Common in thickets and cultivated ground, often also in primeval forest, ascending to 3,000 meters, and descending into the upper part of the tierra caliente, or perhaps even to the coasts. Widely distributed in temperate and tropical regions of the earth. Plants unarmed, usually herbaceous and annual, but sometimes suffrutescent and a meter high, the slender branches puberulent or villosulous; leaves long-petiolate, mostly ovate, 10 cm. long or less, acute or acuminate, obtuse or rounded at the base or often cuneately long-decurrent, entire or

sinuate-dentate, thinly villosulous or glabrate; flowers white, umbellate, the umbels inserted below the axils, pedunculate, few-flowered, the flowers slender-pedicellate; corolla usually white, 2–4 mm. long; fruit globose, 5–7 mm. in diameter, black. *S. nigrum* var. *amethystinum* Kuntze (Rev. Gen. 2: 455. 1891; Irazú, *Kuntze*) is a form with bluish corollas, of occasional occurrence. The plant is a highly variable one, and it is probable that careful study will show that the tropical American material is divisible into several species, none of which, perhaps, is true *S. nigrum* of the Old World. The Costa Rican plant is undoubtedly native. The species is one of the common weeds in most parts of Central America. In Salvador the young shoots and leaves are cooked and eaten like spinach, for which they make a good substitute. The sweet, insipid fruits are often eaten, at least by children. Those of Old World plants are believed to have, at least at times, poisonous properties, but the fruits of American plants are eaten in many regions. Selected forms of the *nigrum* group, with fruits much larger than in wild plants, are sometimes cultivated in the United States for their fruits, used in making pies and other dishes.

Solanum ochraceo-ferrugineum (Dunal) Fernald. *Berengena. S. diversifolium* Schlecht., non Humb. & Bonpl. Common in thickets of the tierra caliente, often in second-growth, ascending to the Meseta Central. Panama to Mexico, and probably ranging even more widely. An erect shrub of 1–3 meters, the branches stellate-tomentose, armed with remote, short, somewhat recurved prickles, the pubescence fine and appressed, nowhere glandular; leaves short-petiolate, ovate-oblong to broadly ovate, mostly 10–15 cm. long, usually rather deeply sinuate-lobate but sometimes entire, often cordate at the base, densely and finely stellate-tomentose, usually unarmed; flowers in small, lateral, pedunculate cymes; corolla white or bluish, 12–16 mm. long, stellate-tomentose outside; anthers 5 mm. long; ovary glabrous; berries globose, yellow, 1–1.5 cm. in diameter. It seems probable that some earlier name will be found for this common plant of Mexico and Central America, which probably extends southward into at least northern South America.

Solanum parcebarbatum Bitter, Repert. Sp. Nov. 18: 51. 1922. Forests of Térraba, 260 meters, *Pittier 3991*. Frequent in thickets of the tierra caliente, also ascending to the forests of the temperate region, at 2,100 meters or less; region of San Ramón. Panama to Guatemala. Usually a shrub of 1–3 meters, but sometimes a tree of 10 meters with a trunk 10 cm. in diameter, unarmed, the bark smooth,

olive-gray, the branchlets minutely pilosulous or glabrate; leaves subgeminate, those of a pair unequal, the larger ones on petioles 1–1.5 cm. long, broadly lanceolate to ovate or oblong-elliptic, mostly 9–14 cm. long, acute or acuminate, acute at the base and usually more or less decurrent, entire, glabrous above, barbate beneath in the axils of the nerves; inflorescences lateral, mostly opposite the leaves, racemiform or umbelliform, short-pedunculate, about 10–14-flowered, the pedicels 7–10 mm. long, pilosulous; calyx short-campanulate, 1.5 mm. long, the lobes obtuse; corolla white, almost 1 cm. broad, glabrous outside; berries globose, 10–12 mm. in diameter. It is probable that *S. parcebarbatum* is synonymous with *S. nudum* HBK.

Solanum pertenue Standl. & Morton, sp. nov.—Frutex 0.9–1.2 m. altus; ramuli graciles, vix 1 mm. diam., minute puberuli; folia solitaria, breviter petiolata, petiolo 2–4 mm. longo; laminae lanceolatae, 7–10 cm. longae, 2–3 cm. latae, longe acuminatae, basi cuneatae, membranaceae, integrae, omnino glabrae, venis primariis ca. 5-jugis; inflorescentia oppositifolia, sessilis, uniflora, pedicello ca. 1 cm. longo, tenuissimo, ca. 0.25 mm. diam.; calyx vix 1 mm. longus, tubo ca. 0.5 mm. longo, glabro, lobis obtusis; corolla alba, 3.5 mm. longa, tubo brevi, lobis lanceolatis glabris; antherae ca. 2 mm. longae. —Santa María de Dota, Prov. San José, December, 1925, alt. 1,500–1,800 meters, *Standley 42852* (type in U. S. Nat. Herb., No.1,252,986). Distinguished from other Costa Rican species by the entirely glabrous leaves, and the 1-flowered inflorescence opposite the leaves. The pedicel is very slender and the calyx and corolla are minute.

Solanum phaseoloides Polak. Linnaea 41: 585. 1877. *S. olivaeforme* Donn. Smith. In forest on old logs, Desengaño, *Polakowsky 147*. Frequent in mountain forests, usually terrestrial but sometimes epiphytic, chiefly at 1,200–1,500 meters. Ranging to southern Mexico. Plants herbaceous, unarmed, creeping, rooting at the nodes, glabrous throughout or practically so; leaves long-petiolate, 3-foliolate, the leaflets petiolulate, ovate to elliptic, 2–3.5 cm. long, obtuse or subacute, entire; flowers white, the inflorescences inserted below the axils, slender, few-flowered, the flowers slender-pedicellate; calyx 2 mm. long, shallowly lobate; corolla 6–8 mm. long, the lobes very narrow; fruits oblong-ovoid, 2–3 cm. long. A species easy of recognition because of the creeping habit and palmately 3-foliolate leaves.

Solanum Pittieri Bitter, Repert. Sp. Nov. 12: 66. 1913. Alto del Roble, 2,000 meters, in forest, *Pittier 18*. Slopes of Barba and region of San Ramón, at 850–2,400 meters. Endemic. Plants

herbaceous, erect, almost a meter high, unarmed, the branches glabrous or nearly so; pseudostipules none; leaves pinnate, long-petiolate, the leaflets 5, broadly lanceolate or lance-oblong, short-petiolulate, 5–10 cm. long, long-acuminate, attenuate to the base, thin, entire, sparsely short-villous above, villosulous beneath on the costa and nerves; inflorescences axillary, solitary or geminate, short-pedunculate, 7–20-flowered, the pedicels 6–8 mm. long, in age longer, short-pilose; calyx campanulate, 2.5 mm. long, the lobes triangular, obtuse; corolla pale green, 1 cm. broad, sparsely pilosulous outside; berries conic or ovoid, about 2 cm. long, acute.

Solanum ramonense Morton & Standl., sp. nov.—Frutex erectus inermis 2–3 m. altus, ramulis teretibus glabris; folia spurie opposita, parium valde inaequalia, minora fere stipuliformia suborbicularia vel orbiculari-ovata brevissime petiolata apice rotundata vel subacuta ca. 1 cm. longa et aequilata; folia majora subcrasse 6–12 mm. longe petiolata, petiolo glabro; lamina oblongo-elliptica vel oblongo-ovata, interdum lanceolato-oblonga, medio vel paullo infra medium latissima, 7–16 cm. longa 2.5–5 cm. lata, sensim vel subito acuminata vel longiacuminata, basi plus minusve inaequali acuta vel cuneato-attenuata, crasse membranacea vel subcoriacea, supra vulgo viridis vel in sicco interdum fusca glabra, costa prominente, subtus paullo pallidior glabra, costa gracili prominente, nervis lateralibus utroque latere ca. 9 gracilibus prominentibus subarcuatis obliquis angulo latiusculo adscendentibus; inflorescentiae ut videtur axillares breviter pedunculatae racemiformes pauciflorae, pedicellis ca. 3–4 mm. longis glabris, in statu fructifero usque 1.5 cm. longis; calyx obconicus 2 mm. longus glaber ad medium 5-lobus, lobis late ellipticis apice subrotundatis; corolla parva alba extus glabra; baccae globosae glabrae 12 mm. diam.—San Rafael de San Ramón, February, 1937, *Brenes 22013* (type in Herb. Field Mus.). La Palma de San Ramón, *Brenes 6241*. Santo Domingo de Vara Blanca, 2,200 meters, *M. Valerio 1564*. Tapesco de Zarcero, 2,000 meters, *Austin Smith H424*. This is closely related to *S. Kenoyeri* Standl., a common shrub of the Panama Canal Zone.

Solanum roblense Bitter, Repert. Sp. Nov. 18: 62. 1922. Forests of Alto del Roble, Volcán de Barba, 2,000 meters, *Pittier 210*. Frequent in the central mountains, 1,800–2,160 meters; regions of Dota and Zarcero. Endemic. A shrub of 2 meters, or sometimes a tree of 7 meters with a trunk 15 cm. in diameter, unarmed, the branchlets glabrous; leaves mostly subgeminate, those of a pair very unequal, the larger ones on petioles 1–2 cm. long, broadly

lanceolate or oblong-lanceolate, 7.5–12 cm. long, widest at or near the middle, acute or acuminate, acute at the base, glabrous; inflorescences opposite the leaves, sessile or nearly so, umbelliform, the pedicels 6–7 mm. long, glabrous; calyx short-campanulate, 1.5 mm. long, the lobes very obtuse; corolla white, 1.5 cm. broad, glabrous outside; fruits glabrous, almost 1 cm. long, creamy yellow.

Solanum rubidum Standl. & Morton, sp. nov.—Frutex scandens; ramuli dense ferrugineo-hirsuti (pilis stellatis sessilibus pluriradiatis, radiis lateralibus brevibus, radio centrali elongato patente pluricellulari), parce aculeati, aculeis 3–6 mm. longis, rubidis, glabris, basi latis, apice recurvis; folia solitaria, petiolata, petiolo 1–3.5 cm. longo, hirsuto; laminae elliptico-ovatae, majores 13–19 cm. longae, 7–11 cm. latae, integrae, acuminatae, basi rotundatae, obliquae, costa interdum aculeatae, supra stellato-scabridae (pilis remotis stellatis sessilibus pauciradiatis, radio centrali elongato), subtus densius pubescentes; inflorescentia extra-axillaris, pedunculo 2–4 cm. longo, hirsuto, pedicellis ca. 7 mm. longis; calycis tubus vix 1 mm. longus, lobis late lanceolatis acutis, extus dense hirsutis, intus basi stipitato-glandulosis, sursum stellato-pubescentibus, inaequalibus, 4 minoribus ca. 8 mm. longis et 3.5 mm. latis, quinto ca. 10 mm. longo; corolla violacea, tubo ca. 2.5 mm. longo, lobis lineari-lanceolatis, ca. 1 cm. longis, extus stellato-hirsutis, sinu non plicato; filamenta 1 mm. longa, libera, glabra, antheris attenuatis aequalibus, ca. 7 mm. longis; ovarium simpliciter pilosum, stylo parce pilosulo; calycis lobi paullo accrescentes, ca. 1 cm. longi, vix nervosi; bacca globosa, 11–15 mm. diam., perspicue hirsuta, pilis simplicibus.—Las Vueltas, Prov. Cartago, January, 1899, alt. 635 meters, *Tonduz 13174* (type in U. S. Nat. Herb., No. 1,324,807). Tuis, 650 meters, *Tonduz 11492*. Turrialba, 700 meters, *Tonduz 9004*. Santiago de San Ramón, 100 meters, *Brenes 14381*. Closely related to *S. erythrotrichum* Fernald, from which it is distinguished by the hirsute pubescence of the berries, the hairs all being simple. The berries of *S. erythrotrichum* are rather sparingly hairy or eventually glabrous, the hairs being stellate. The hairs of the upper leaf surface are also different, those of *S. rubidum* having a long central ray which is absent in *S. erythrotrichum*. Fernald referred *S. erythrotrichum* to section *Torvaria*, but the deeply parted corolla without plicate sinuses removes it from that section. The following additional collections of *S. rubidum* are in the Herbarium of Field Museum: Piedades, near San Ramón, 1,000 meters, *Brenes 4892*. San Pedro de San Ramón, 1,075 meters, *Brenes 4540*.

Solanum rugosum Dunal. Region of El General, and Atlantic tierra caliente. Central America to West Indies and the Guianas. An unarmed shrub or small tree, the branches sparsely and minutely stellate-tomentose with grayish hairs; leaves on petioles 1–2 cm. long, narrowly elliptic or obovate, 12–25 cm. long, falcate-acuminate, long-attenuate to the base, entire, sparsely scabrous above with stellate hairs, green beneath and sparsely stellate-pubescent with minute, sessile hairs; inflorescences terminal, corymbiform, densely many-flowered, long-pedunculate, the flowers short-pedicellate; calyx 3.5–5 mm. long, densely whitish-tomentose, the short lobes semiovate, subacute; corolla white, 8–10 mm. long, tomentose; berries globose, 9–12 mm. in diameter, scabrous at the apex.

Solanum salviifolium Lam. Frequent in thickets of the tierra caliente, and sometimes at higher elevations; Tiquirres; regions of El General and San Ramón; Guanacaste; ascending to 1,700 meters. Mexico to West Indies and northern South America. Plants unarmed, slender, shrubby, sometimes 4.5 meters high, the branches usually recurved or even subscandent, densely and minutely stellate-tomentose; leaves almost sessile, ovate or oblong-ovate, mostly 7–10 cm. long, acuminate, rounded or shallowly cordate at the base, entire, bright green and glabrous above, whitish or silvery beneath with a very dense covering of minute, close, stellate hairs; inflorescences small, corymbiform, terminal and axillary, pedunculate, many-flowered; calyx 2.5–3 mm. long, shallowly repand-dentate; corolla white, 7 mm. long; berries globose, 7 mm. in diameter, glabrous or nearly so.

Solanum sanctaeclarae Greenm. ex Donn. Smith, Bot. Gaz. 37: 311. 1904. La Emilia, Llanuras de Santa Clara, 250 meters, *J. D. Smith 6783*. Rather frequent in the Atlantic tierra caliente; region of San Ramón; Guanacaste. Endemic. A shrub, perhaps scandent, unarmed, the branches densely covered with fulvous, stipitate, stellate hairs; leaves almost sessile, geminate, those of a pair somewhat unequal, ovate to oblong-ovate or obovate, 12–20 cm. long, acuminate, acute and unequal at the base, entire, rather sparsely stellate-pilose on both surfaces with mostly stipitate hairs, green; flowers axillary, solitary or geminate, the pedicels 1 cm. long or less; calyx urceolate-campanulate, 10–12 mm. long, shallowly lobate, densely stellate-tomentose with chiefly stipitate hairs; corolla glabrous; berries almost 1.5 cm. long, subglobose, yellow. The calyx in this species is characteristic and apparently unique. In fruit it appears to be perfectly truncate, but at least in the young flowers

calyx lobes are present. These, however, are later circumscissile at the base! No other species of *Solanum* seems to possess this character.

Solanum savanillense Bitter (Repert. Sp. Nov. 12: 66. 1913) is described by Bitter as Costa Rican, but the locality is presumably in either Colombia or Ecuador.

Solanum scabrum Vahl. Puntarenas, and reported from elsewhere in the Pacific tierra caliente; probably in the tierra caliente of both coasts. Central America to West Indies and northern South America. A scandent shrub, the branches covered with short-stipitate, stellate hairs, armed with recurved prickles 2–3 mm. long; leaves petiolate, oblong or elliptic, 9–15 cm. long, acute or acuminate, acute at the base, repand-dentate, stellate-pilose above, the terminal ray of the hairs much longer than the others, rough, stellate-hispidulous beneath, usually aculeolate along the costa; inflorescences axillary, racemose, scorpioid, 10–15-flowered, the pedicels 6–10 mm. long, minutely aculeolate; calyx 4 mm. long, stellate-hirsute and minutely aculeolate, the lobes semiovate, acuminate; corolla violaceous or white, 14–18 mm. long, stellate-hirsute; berries globose, 6 mm. or more in diameter, sparsely hirsute.

Solanum Seaforthianum Andrews. Frequent in cultivation about the Meseta Central, also in the tierra caliente, and perhaps escaped in places about San José. Widely distributed in tropical America in cultivation, the native habitat uncertain. A large, scandent, slender shrub, unarmed, sparsely puberulent or almost glabrous; leaves long-petiolate, small, thin, pinnate or pinnatifid, the leaflets mostly 3–5, oblong-lanceolate to ovate, generally entire, the upper ones usually confluent and decurrent; cymes large and many-flowered; calyx scarcely 2 mm. long; corolla blue or violet, about 1 cm. long; berries red, 6–9 mm. in diameter. One of the common ornamental vines of Central America, noteworthy for its abundance of brightly colored flowers.

Solanum Storkii Morton & Standl., sp. nov.—Frutex erectus inermis 3–4.5 m. altus, ramis subteretibus dense foliatis densissime pilis inaequalibus ochraceis furfuraceo-stellato-puberulis, pilis fere tuberculiformibus; folia alterna solitaria breviter petiolata crasse membranacea vel subcoriacea, petiolo ad 1 cm. longo saepe fere ad basin marginato; lamina anguste oblongo-lanceolata prope medium latissima plerumque 6–9 cm. longa atque 1.5–2 cm. lata, marginibus vulgo subrevolutis, longe anguste attenuato-acuminata, basi attenu-

ata et decurrens, supra laete viridis, minutissime sparse stellato-puberula vel fere omnino glabra, lucida, costa gracili prominula, subtus paullo pallidior sparse minutissime stellato-puberula vel fere glabra, costa elevata, nervis lateralibus utroque latere ca. 12 irregularibus subarcuatis angulo lato divergentibus parum obliquis; inflorescentiae terminales vel laterales corymbiformes laxe pauci- vel multiflorae 2–3 cm. longe pedunculatae, pedicellis 5–15 mm. longis in statu fructifero superne incrassatis sparse vel dense furfuraceo-puberulis; calyx campanulatus 3 mm. longus extus furfuraceo-puberulus, breviter 5-lobus, lobis latis obtusis, in statu fructifero paullo accrescens; corolla violacea 8–9 mm. longa extus minutissime subdense stellato-puberula profunde lobata, lobis oblongo-triangularibus obtusis; antherae 4 mm. longae; baccae globosae glabrae lucidae 8 mm. diam.—Ojo de Agua, 2,850 meters, June, 1932, *H. E. Stork 3023* (type in Herb. Field Mus.). East of Irazú, 2,850 meters, *Stork 2068*. Volcán de Turrialba, 2,800 meters, *Pittier 13077* (*J. D. Smith 7538*). Oak forest, Volcán de Poás, 2,400 meters, *Stork 2515;* at 2,700 meters, *Stork 3347*. Summit of Volcán de Poás, 2,575 meters, *Allen 604*. Volcán de Poás, 2,400–2,800 meters, *Tonduz 10803; Standley 34902; Jiménez 1025; Pittier 2054; J. D. Smith 6668*. Volcán de Turrialba, 2,000–2,400 meters, *Standley 35021*. Sitio Birrís, 2,840 meters, *Pittier 155*. Volcán de Barba, 2,460 meters, *Pittier 805*. Cerro de Las Vueltas, 2,700–3,000 meters, *Standley & Valerio 43558, 43729*. Volcán de Irazú, *Popenoe 1014*. The Costa Rican plant has been confused with *S. pulverulentum* Pers., a species of the South American Andes.

Solanum suaveolens Kunth & Bouché. *S. suaveolens* var. *pliophyllidium* Bitter, Repert. Sp. Nov. 11: 353. 1912 (Las Vueltas, Tucurrique, 635–700 meters, *Tonduz 13048*). Forests of the upper part of the Atlantic tierra caliente, ascending the slopes of the central mountains to 3,000 meters; mountains of Guanacaste. Mexico to Bolivia. Plants herbaceous, unarmed, erect or decumbent, the branches sparsely short-pilose when young; pseudostipules present, 10–14 mm. long; leaves pinnate, petiolate, the lateral leaflets 4–6 pairs, short-petiolulate or subsessile, sometimes with smaller leaflets interposed, lanceolate or broadly lanceolate, subacuminate, entire, sparsely short-villous above, villosulous beneath with shorter hairs, chiefly on the nerves; inflorescences lateral, long-pedunculate, about 15-flowered, the pedicels in fruit 1 cm. long, articulate at the base; calyx lobes linear-lanceolate; corolla white, 1 cm. broad, sparsely pilose outside; berries ellipsoid, about 2 cm. long.

Solanum tenuilamellosum Bitter, Repert. Sp. Nov. 18: 57. 1922. Piedades de San Ramón, 1,100 meters, *Brenes 14384* (photo. seen, ex herb. Berol.). Known only from forests of the region of San Ramón, 900–1,100 meters. Endemic. A shrub a meter high or less, the branches glabrous; leaves solitary or subgeminate, those of a pair very unequal, the larger ones on petioles 6–12 mm. long, lanceolate or elliptic-lanceolate, widest at or slightly below the middle, 9–15 cm. long, acuminate, obtuse or acute and more or less unequal at the base, entire, glabrous; inflorescences lateral, opposite the leaves, racemiform, few- to many-flowered, the pedicels 12–15 mm. long, glabrous; calyx short-campanulate, 2–2.5 mm. long, the lobes broadly elliptic, obtuse; corolla white, 5 mm. long and 8 mm. broad, glabrous outside.

Solanum torvum Swartz. *Berengena, Berengena silvestre, Berengena cimarrona. ?S. torvum* var. *integerrimum* Kuntze, Rev. Gen. 2: 455. 1891 (type collected by Kuntze, the locality not indicated). Occasional in thickets, Meseta Central to the Pacific coast. Widely distributed in tropical America. An erect shrub of 1–3 meters, the branches densely stellate-pubescent with short-stipitate hairs, armed with short prickles; leaves petiolate, broadly ovate, 20 cm. long or less, acute or acuminate, commonly rounded or subcordate at the base, sinuate-lobate, stellate-tomentose on both surfaces, sometimes aculeolate beneath; inflorescence cymose, with few or many flowers, the pedicels elongate, erect in fruit, their pubescence partly of glandular hairs; corolla white, 10–12 mm. long; ovary glabrous; fruit yellow, globose, 1–1.5 cm. in diameter.

Solanum trizygum Bitter. In forests, regions of Dota and San Ramón, 1,000–1,800 meters; El General. Ranging to Venezuela. Plants herbaceous, unarmed, erect, a meter high or less, the stems glabrous or nearly so; pseudostipules none; leaves pinnate, the leaflets thin, usually 7, bright green, oblong-lanceolate, 10–15 cm. long, narrowly long-acuminate, entire, minutely appressed-pilosulous above along the costa, otherwise glabrous; inflorescences geminate, axillary, 7–9-flowered, short-pedunculate, the pedicels in anthesis 6–7 mm. long, elongating in age; calyx campanulate, 2 mm. long, the lobes short, obtuse; corolla white, small; fruit ovoid or elongate-conic, 2 cm. long or longer.

Solanum truncatum Standl. & Morton, sp. nov.—Frutex 1.8–3 m. altus; ramuli mediocriter stellato-pubescentes (pilis breviter stipitatis, radio centrali nullo), parce aculeati, aculeis 3–5 mm. longis, glabris, basi latis, rectis vel leviter recurvis; folia solitaria vel sub-

geminata, petiolata, petiolo 3–4.5 cm. longo, interdum aculeato; laminae ovatae, majores 18–28 cm. longae, 10–19 cm. latae, grosse sinuato-dentatae, dentibus utroque latere 2 vel 3, acuminatae, basi rotundatae, obliquae, utrinque stellato-scabridulae, pilis minutis subremotis sessilibus pauciradiatis, radio centrali nullo; inflorescentia extra-axillaris, sessilis, inermis, pedicellis deflexis, 6–8 mm. longis, subdense stellato-tomentosis; calyx ca. 6.5 mm. longus (tubo 4.5 mm. longo), truncatus, extus adpresso-pubescens, apice dentibus 5 subulatis 2 mm. longis instructus, sinubus demum alte fissis; corolla alba, ca. 13 mm. longa, tubo 2 mm. longo, lobis lanceolatis acutis extus pubescentibus, sinu non plicato; stamina aequalia, filamentis 2 mm. longis glabris liberis, antheris 6 mm. longis attenuatis; ovarium apice stipitato-glandulosum; stylus glaber; pedicelli fructiferi 17 mm. longi, apice incrassati; bacca viridis glabra globosa, 11–12 mm. diam. —Las Nubes, Prov. San José, March, 1924, alt. 1,500–1,900 meters, *Standley 38760* (type in U. S. Nat. Herb., No. 1,228,390).

Solanum tuberosum L. *Papa. Potato.* Costa Rica is unique in Central America in that potatoes are here an important agricultural product, the only other region of Central America in which they are much grown being Guatemala. In Costa Rica they thrive from 1,200 meters up to the upper limits of cultivation on the volcanoes, where there are extensive fields of them. In fact, for the people living on the high slopes of the central volcanoes, potatoes and milk are the chief articles of diet, and the visitor there sometimes finds nothing else to eat. The potatoes of the upper slopes of Irazú are of excellent quality, but their cultivation is sometimes hampered by the attacks of a fungus, *Micropuccinia Pittieriana* (P. Henn.) Arthur & Jackson, which has caused great damage. The potato is of South American origin, and the date of its introduction into Costa Rica is unknown, although it was doubtless many years after the Spanish conquest.

Solanum umbellatum Mill. *Zorrillo.* Common in thickets and hedges about the Meseta Central, extending to the Pacific coast. Widely distributed in tropical America. Usually a shrub of 1–3 meters, unarmed, the stems rather densely covered with long and short hairs that bear tufts of radiating branches at their apex; leaves oblanceolate to oblong-elliptic, 20 cm. long or less, acuminate, long-attenuate to the base, the wing extending to the base of the petiole, green above, very rough to the touch, stellate-scabrous, densely pubescent beneath with stellate, mostly stipitate hairs; cymes dense and many-flowered, long-pedunculate, terminal; calyx

4–5 mm. long, the lobes broad, obtuse; corolla white, about 1 cm. long; berries yellow, 1–1.5 cm. in diameter, glabrous. One of the common, weedy shrubs in many parts of Central America. It has often been listed under the name *S. callicarpifolium* Kunth & Bouché.

Solanum Valerianum Morton & Standl., sp. nov.—Frutex 1–1.5 m. altus, ramulis gracilibus teretibus sat dense foliatis dense pilis albidis patentibus hirsutis; folia ut videtur omnia solitaria breviter petiolata membranacea in sicco laete viridia, petiolo gracili 3–7 mm. longo sparse breviter hirsuto; lamina anguste lanceolato-oblonga 9–15 cm. longa 2.5–4 cm. lata longe acuminata, basi obliqua cuneato-attenuata, supra glabra, subtus ad costam nervosque sparse pilis longiusculis albidis patentibus pilosa, costa gracili prominente, nervis lateralibus utroque latere ca. 10 teneris arcuatis obliquis angulo latiusculo adscendentibus; inflorescentiae oppositifoliae laxe pauci(2–3)-florae racemiformes, pedunculo gracillimo 5–7 mm. longo, pedicellis gracillimis usque 1 cm. longis glabris vel hinc inde pilosis, fructiferis ad 2.5 cm. longis; calyx late campanulatus vix 1.5 mm. longus glaber, lobis latis obtusis; corolla alba 4 mm. longa; bacca globosa glabra, basi et apice late rotundata, usque 1.5 cm. diam.—Playa Blanca, Golfo Dulce, February, 1933, *Manuel Valerio 424* (type in Herb. Field Mus.). Moist forest, Capulín, Prov. Alajuela, 80 meters, *Standley 40158, 40167*. Moist forest, La Tejona, north of Tilarán, Guanacaste, 600–700 meters, *Standley & Valerio 45902*. The last three collections cited are in the United States National Herbarium.

Solanum verbascifolium L. *Zorrillo.* Widely distributed in tropical America. An unarmed shrub or small tree, usually 1–3 meters high, the branches densely stellate-tomentose with minute, ochraceous hairs; leaves slender-petiolate, ovate or elliptic, mostly 12–25 cm. long, acute or abruptly short-acuminate, rounded or subtruncate at the base and usually abruptly short-decurrent, entire, finely velvety-tomentose on the upper surface with stellate hairs, whitish and densely stellate-tomentose beneath; inflorescences terminal, corymbiform, densely many-flowered, long-pedunculate, the pedicels 3–8 mm. long; calyx 4–5 mm. long, densely stellate-tomentose, the lobes semiovate, subacute; corolla white, about 8 mm. long, stellate-tomentose outside; ovary stellate-tomentose; berries globose, 6–12 mm. in diameter, yellow. In Costa Rica there are two distinct forms of *S. verbascifolium.* The typical form of the species has leaves scarcely bicolorous, the upper surface being densely tomentose, and the ovary is densely stellate-tomentose.

At present this is known in Costa Rica from a single collection, *Standley & Valerio 45360*, from Los Ayotes, Guanacaste. The second form has leaves green above and pale beneath, the upper surface minutely scabrous-stellate, the hairs spaced and not covering the surface, and the ovary is only slightly hairy at the apex. This is var. *adulterinum* (Ham.) G. Don (var. *viridi-scabrum* Dunal). Eventually it may be considered a good species, in which case the proper name will be *S. Eduardi* Kunth & Bouché. It is known from Guanacaste and from several localities in the tierra caliente of both coasts.

Solanum Wendlandii Hook. f. Bot. Mag. 113: *pl. 6914*. 1887. *Volcán, Flor del volcán*. Described from living plants grown in the Kew Gardens, from material sent from Costa Rica by Wendland. Forests of the upper slopes of Irazú; region of Zarcero, at 1,650 meters; also cultivated commonly for ornament. Endemic. A large, woody vine, glabrous throughout, sparsely armed with short prickles (these often wanting on herbarium specimens); leaves long-petiolate, the upper ones oblong, acute to long-acuminate, entire or 3-lobate, cordate to acute at the base, the lower leaves pinnate or pinnatifid, the petioles often armed with short, recurved prickles; flowers very showy, in large cymes, long-pedicellate; calyx 4 mm. long or less, deeply lobate; corolla lilac-blue, as much as 6 cm. broad; fruits ovoid, of the size of a large apple. This is one of the handsomest and showiest of all Costa Rican plants, extremely beautiful because of its abundance of blue blossoms. It has been introduced into cultivation in other parts of Central America, as well as in hothouses of temperate regions.

VALERIOA Standl. & Steyermark, gen. nov.

Frutices vel arbores, ramulis subteretibus, foliis alternis et oppositis, penninerviis, crenato-dentatis, membranaceis. Flores hermaphroditi, cymoso-paniculati, cymis axillaribus, pedunculis oppositis. Calyx in lobos 5 lanceolato-triangulares partitus. Corolla breviter tubulosa, calyce longior, lobis 5, valvatis, subaequalibus, tubo lato, basi dilatato. Stamina 5, omnia fertilia, aequalia, tot quot corollae lobi iisque alterna, fauce corollae affixa, filamentis filiformibus; antherae versatiles, subquadratae, loculis 4. Ovarium superum, sessile, turbinatum, 1-loculare, basi dilatata disciformi-incrassata. Stylus tenuis, simplex. Stigma capitatum, subbilobatum. Ovula plura, medio placentae affixa. Fructus ignotus.—Type species, *Valerioa costaricensis* Standl. & Steyermark. The genus is dedicated

to Juvenal Valerio Rodríguez, Director of the Museo Nacional de Costa Rica. To him the senior author is indebted for a multitude of courtesies, and for the most delightful and sympathetic companionship upon many pleasant excursions into the mountains of Costa Rica. His botanical enthusiasm, continued for many years even under the severest discouragement, is largely responsible for the preparation and final publication of this *Flora of Costa Rica.*

Valerioa costaricensis Standl. & Steyermark, sp. nov.—*Cuerillo.* Ramuli novelli ad apices hirtelli; foliis petiolatis, cuneato-oblongo-lanceolatis, abrupte acuminatis, basin versus longe sensim attenuatis, grosse saltem supra basin crenato-dentatis, glabris vel subtus ad nervos minute puberulis, nervis 10–12-jugis, adscendentibus, petiolo excluso 15–20 cm. longis, 5–7.5 cm. latis; petiolis 1–2 cm. longis, dense minute puberulis; pedunculis dense minute puberulis, multifloris, oppositiramosis, bracteatis, foliis duplo brevioribus; lobis calycis 1.1–1.3 mm. longis, acutis vel acuminatis, marginibus dense minute ciliolatis, aliter glabris; corolla 5.5–6 mm. longa, tubo basi dilatato, ca. 3.5 mm. longo atque paullo angustiore, glabro, lobis recurvo-patentibus, intus et margine dense minuteque velutinis; staminibus et stylo exsertis.—Santiago de San Ramón (Calera, Río Jesús), February 25, 1929, *A. M. Brenes 6700* (type in Herb. Field Mus.); same locality and date, *Brenes 6691.*

The proper family position of this Costa Rican plant is somewhat problematical. The general appearance and arrangement of the inflorescence and leaves are suggestive of some verbenaceous genera, such as *Aegiphila,* while the deeply parted calyx and gradually pointed ovary, as well as the dilated corolla base, are reminiscent of a number of groups of Scrophulariaceae. The numerous ovules found in *Valerioa* distinguish the genus from all Verbenaceae, while the valvate corolla lobes are at variance with all known Scrophulariaceae. The more or less equal, valvate corolla lobes and numerous ovules suggest a closer relationship with the Solanaceae than with either the Verbenaceae or Scrophulariaceae, although it is admittedly close to one or the other of those families. The general appearance of the plant has little in common with most groups of Solanaceae, variable as that family is. It is unfortunate that fruit is not available, since it might well determine definitely the plant's true position.

SCROPHULARIACEAE. Figwort Family

Herbs, rarely shrubs; leaves opposite or alternate, without stipules; flowers perfect, usually irregular and complete; calyx in-

ferior, with 4 or 5 lobes, teeth, or segments; corolla gamopetalous, the limb generally somewhat bilabiate; stamens 2, 4, or 5, didynamous or almost equal, inserted on the corolla alternate with its segments; pistil 1, entire or bilobate; ovary superior, 2-celled; fruit commonly capsular and many-seeded.—There probably are a few other genera represented in Central America.

ALONSOA Ruiz & Pavón

Branched herbs or shrubs, usually glabrous except in the inflorescence, the branches tetragonous; leaves mostly opposite or ternate, entire or serrate, the floral leaves alternate; flowers in terminal racemes, the pedicels solitary, ebracteolate; calyx 5-parted, with narrow segments; corolla resupinate by torsion of the pedicel, explanate-rotate, the tube almost none, the limb 5-lobate; perfect stamens 4; capsule ovate or oblong, obtuse, compressed; seeds numerous, small, punctate-rugose.—A single species is found in Central America.

Alonsoa meridionalis (L. f.) Kuntze. *A. caulialata* Ruiz & Pavón. Common in the Cantón de Dota, also on the slopes of Barba, 1,800–3,000 meters, in forest and thickets. Mexico to Peru. A branched herb 1.5 meters high or less, almost glabrous, the stems 4-angulate; leaves opposite, petiolate, lanceolate or ovate, serrate, acuminate, acute at the base; flowers red or pink, in paniculate racemes; capsule ovoid, 1–1.5 cm. long, acute.

ANGELONIA Humb. & Bonpl.

Simple or branched herbs, annual or perennial; leaves opposite or the upper ones alternate; flowers often large and showy, solitary in the leaf axils or in terminal racemes; calyx 5-parted; corolla subrotate, 5-lobate, the 2 posterior lobes outermost in bud, the short tube saccate anteriorly, the anterior lobes with hornlike appendages at the base; stamens 4, didynamous, the anther sacs divaricate; seeds foveolate.—One other Central American species is known, in British Honduras.

Angelonia angustifolia Benth. Coto (cultivated?), *M. Valerio 386*. Cultivated commonly as an ornamental plant, but probably not native. Originally from Mexico. A branched herb a meter high or less, glabrous; leaves almost sessile, linear-lanceolate, attenuate, serrulate or almost entire; flowers violet, 1.5 cm. long, in elongate racemes; sepals narrow, almost distinct; corolla broad, bilabiate, the tube very short, with a process or short spur near the

base; capsule small, globose. A highly ornamental plant because of its showy and pretty flowers.

ANTIRRHINUM L. Snapdragon

Annual or perennial herbs; leaves alternate or the lower opposite; flowers solitary in the leaf axils or in terminal racemes, the pedicels ebracteate; calyx 5-parted, the segments imbricate; corolla usually large and showy, anteriorly saccate or gibbous at the base, the posterior lobe erect, shallowly 2-lobate, the anterior lip spreading, 3-lobate; stamens 4, didynamous, included, the anther cells parallel; capsule ovoid or globose; seeds rugose or smooth.—No species of the genus are native in Central America.

Antirrhinum majus L. *Boca de león.* Planted commonly in gardens as an ornamental plant. Native of Europe. A low perennial with narrow leaves and with large and showy flowers that exhibit great variation in color.

BACOPA Aubl.

Small herbs, the leaves opposite; flowers small, axillary, solitary or fasciculate, the pedicels naked or 2-bracteolate; calyx 5-parted, the segments unequal; corolla somewhat bilabiate; stamens 4, included; capsule bivalvate.—Other species are known from Central America.

Bacopa Monnieri (L.) Wettstein. *Herpestis Monnieria* HBK. Common in moist places of the coasts, often growing in sand along streams (*arenales*). A species of wide distribution. Plants prostrate, fleshy, glabrous; leaves oblong or spatulate, rounded at the apex, entire; pedicels bibracteolate, longer than the leaves; corolla white or purple. In Nicaragua the name Verdolaga is given to the plant.

Bacopa procumbens (Mill.) Greenm. *Herpestis chamaedryoides* HBK. Common in moist places, often in sandy stream beds, Meseta Central to the coasts; region of San Ramón; collected on Volcán de Barba at 2,400 meters. Widely distributed in tropical regions. Plants glabrous, erect or procumbent; leaves small, dentate, ovate, acute, petiolate; pedicels bracteolate, longer than the leaves; corolla yellow.

Bacopa Salzmanni (Benth.) Chod. & Hassl. *Herpestis Salzmanni* Benth. Common in marshes or other wet places, Meseta Central to the Atlantic coast. Mexico to Brazil. Plants procumbent, somewhat fleshy, the stems thick, soft-pilose; leaves

sessile, orbicular, entire, pilose beneath; pedicels elongate, not bracteolate; corolla purple. Costa Rican collections have been referred to *B. violacea* (Pennell) Standl., a species that probably is not distinct from *B. Salzmanni*.

BUCHNERA L.

Perennial or biennial herbs, erect and sparsely if at all branched, blackening in drying, with rough pubescence; lower leaves opposite, the upper often alternate, narrow, stiff; flowers small, white to blue or purple, in terminal, bracteate spikes, the lower flowers usually remote in the spike; calyx tubular, 5–10-nerved, 5-dentate; corolla salverform, the slender tube somewhat curved, the limb almost equally 5-lobate, the anterior lobes external in the bud; stamens 4, didynamous, the anther sacs confluent into 1; seeds numerous, reticulate.—One or two other species grow in Central America.

Buchnera pusilla HBK. *B. major* Polak. Linnaea 41: 588. 1877 (near San José, *Polakowsky 519*). Common in pastures and savannas, Meseta Central to the Pacific coast, ascending to 1,600 meters; region of San Ramón; Guanacaste. Widely distributed in tropical America. Plants erect, annual or perennial, simple or somewhat branched, slender, with rough pubescence of stiff, whitish hairs; leaves opposite, linear or narrowly lanceolate, almost sessile, serrate or nearly entire; flowers purple or pink, in elongate, leafy spikes; calyx tubular, with short teeth; corolla 1 cm. long, the tube slender and elongate. Costa Rican collections have been referred to *B. mexicana* Hemsl. It is probable that *B. lithospermifolia* HBK., a very similar species, occurs in the Pacific coast of Costa Rica.

CALCEOLARIA L.

Reference: Kraenzlin, Pflanzenreich IV. 257C. 1907.

Herbs (the Central American species); leaves opposite; flowers small or large, usually yellow, cymose; calyx 4-parted; corolla bilabiate, the tube very short, the lower lip large and inflated; stamens 2; fruit capsular.—There are probably a few other species in Central America. Most members of this large genus are natives of the Andes of South America.

Calceolaria irazuensis Donn. Smith, Bot. Gaz. 20: 292. 1895. *C. costaricensis* Kraenzl. Ann. Hofmus. Wien 22: 192. 1907 (type collected by Endres, without indication of the exact locality). Slopes of Volcán de Irazú, 2,700 meters, *J. D. Smith 4904*. Moist forests of Irazú and Turrialba, at 2,400–2,700 meters. Endemic.

A branched herb a meter high or less; leaves oblong-lanceolate, acuminate, short-petiolate, pubescent, serrate or crenulate; corolla yellow, 2 cm. long. An exceptionally showy plant because of its large flowers.

Calceolaria mexicana Benth. *Botón de oro.* Common in the central region, 1,200–2,700 meters, growing in moist thickets or forest, sometimes in cultivated ground; region of San Ramón. Extending to Mexico. A simple or branched annual, viscid; leaves pinnatisect or the lowest trilobate, petiolate; corolla 1 cm. long. This species is seen sometimes in gardens of the Meseta Central. Costa Rican collections referred to *C. glutinosa* Heer & Regel, a synonym of *C. gracilis* HBK., a South American species, probably are referable to *C. mexicana*, which is perhaps only a form of *C. gracilis*.

Calceolaria Storkii Standl., sp. nov.—Subscandens, herbacea vel suffruticosa, ramis gracilibus teretibus ferrugineis dense minute puberulis atque glutinosis, internodiis foliis duplo brevioribus; folia breviter petiolata opposita subcoriacea, petiolo usque 3 mm. longo piloso; lamina anguste lanceolata 4–7 cm. longa 9–16 mm. lata longe sensim attenuata, basi acuta vel obtusa, arcte serrato-dentata, supra lucida ubique minutissime puberula atque vernicosa, costa nervisque plus minusve impressis, subtus multo pallidior, ut videtur minute puberula et vernicosa, costa crassiuscula prominente, nervis lateralibus subarcuatis obliquis angulo latiusculo adscendentibus, venis conspicue laxe reticulatis; flores in corymbos terminales laxe paucifloros dispositi, pedicellis gracilibus usque 2 cm. longis minute puberulis glutinosis; calyx 7 mm. longus profunde lobatus, lobis late ovato-ellipticis acutis viridibus; corollae labium inferius 2 cm. longum 1.5 cm. latum.—Cerro de La Muerte, 3,000 meters, June, 1932, *H. E. Stork 3048* (type in Herb. Field Mus.). Among Costa Rican species this is distinguished at once by the glutinous covering on almost all parts of the plant.

Calceolaria trilobata Hemsl. *C. sciadephora* Donn. Smith, Bot. Gaz. 25: 151. 1898 (paramos of Cerro de La Muerte, *Pittier 3486*). Paramos of the region of Dota, 3,100 meters. Also in Colombia and Guatemala. A tall, pilose, viscid herb; leaves dilated and united by their bases, the blades triangular and dentate; corolla 1.5 cm. long.

CAPRARIA L.

Perennial herbs or low shrubs, abundantly pubescent in most species; leaves alternate, narrow, dentate; flowers axillary, pedi-

cellate; sepals 5, narrow, subequal; corolla white, campanulate, 5-lobate; stamens usually 5, the anther sacs divergent and confluent; capsule loculicidally dehiscent; seeds reticulate.—One other species may reach Central America.

Capraria biflora L. Occasional in waste places of the tierra caliente, but the plant is not common in Central America. A species of wide distribution. An erect, branched herb, a meter high or less, pubescent; leaves lanceolate, serrate. Known in Panama by the names Cola de gallo and Hierba té.

CASTILLEJA Mutis

Herbs, parasitic upon the roots of other plants; leaves alternate, narrow, entire or lobate; flowers red or yellow, in terminal, bracted spikes, the bracts large, entire or lobate, colored; calyx tubular; corolla very irregular, bilabiate, the lower lip small, 3-lobate, the upper narrow and elongate; stamens 4; fruit capsular.—Other species occur in northern Central America.

Castilleja communis Benth. Common in pastures and thickets of the temperate region, from Turrialba to the Meseta Central, 900–1,800 meters; region of San Ramón. Widely distributed in tropical America. Plants simple or sparsely branched, 20–40 cm. high, pubescent; leaves and bracts lanceolate or linear, entire; bracts red, at least at the tips; flowers almost sessile; corolla only 1 cm. long.

Castilleja irasuensis Oerst. Vid. Medd. Kjoebenhavn 27. 1853. *Gallito.* Volcán de Irazú, 2,700–3,000 meters, *Oersted.* Frequent in pastures and meadows of the cold region, central volcanoes and mountains of Dota. Also in Panama. An erect, branched herb, sometimes more or less scandent and as much as 2 meters long, almost glabrous; leaves and bracts linear, more or less lobate, the bracts bright red; calyx red, with yellow margins; corolla 3 cm. long. Hemsley reports a collection from Irazú at 3,000 meters by Wendland under the name *C. fissifolia* L. f. Probably the plant so reported is *C. irasuensis.*

Castilleja Quirosii Standl., sp. nov.—Perennis erecta, caulibus ut videtur 30–60 cm. altis simplicibus vel superne pauciramosis strictis gracilibus teretibus sat dense pilis albidis brevibus patentibus vel subrecurvis hispidulis, dense foliatis; folia linearia plerumque 1–1.5 cm. longa vix ad 1.5 mm. lata obtusa crassiuscula dense cinereo-puberula vel hispidula integra vel saepius saltem superiora

prope apicem utroque latere lobulis 1–2 brevissimis obtusis aucta; flores racemosi, racemis terminalibus sublaxis usque 11 cm. longis, pedicellis gracilibus breviter pilosis plerumque 4–6 mm. longis, bracteis calyci vix aequalibus foliis similibus, vulgo prope apicem lobulis 2–3 longioribus patentibus auctis; calyx ca. 12 mm. longus et fere 3 mm. crassus dense breviter plus minusve viscide pilosus, ad medium vel profundius bilobus, lobis angustis obtusis; corolla ca. 23 mm. longa angusta dorso galeae albido-tomentulosa, aliter glabra, tubo ca. 8 mm. longo, labio inferiore brevi trilobo, galea lineari ca. 1.5 cm. longa paullo incurva.—Alrededores del cráter del Volcán de Irazú, August, 1935, *M. Quirós 329* (type in Herb. Field Mus.). Cerro de Escazú, 1,500 meters, *Solís 261*. Thickets of Piedra Blanca, above Escazú, *Standley 32600*. This may be only a variety of *C. irasuensis*, to which its relationship evidently is close, but in that the stems and leaves are almost glabrous, and the leaves much more divided.

DERMATOCALYX Oerst.

The genus consists of a single species.

Dermatocalyx parviflorus Oerst. Vid. Medd. Kjoebenhavn 29. 1856. *Colmillo*. Naranjo, *Oersted*. Found also at La Palma, Santa Clara de Cartago, Guápiles, San Pedro Coronado, and in the region of San Ramón. Panama to British Honduras. A shrub or small tree, usually epiphytic, sometimes terrestrial, often scandent and 3–6 meters long, glabrous; leaves opposite or alternate, coriaceous, petiolate, elliptic or oval, obtuse, large; flowers in axillary racemes or small panicles; calyx campanulate, 6 mm. long, the lobes short and broad; corolla white, 6–28 mm. long, the small lobes purple; fruit coriaceous, globose. The plant is represented in herbaria by scant material, and is still imperfectly understood. It may well be that there is more than one species of this somewhat anomalous genus.

DIGITALIS L. Foxglove

Large herbs, the leaves alternate, the lowest ones mostly large and elongate, entire or dentate; flowers large and showy, disposed in long, terminal, usually secund racemes; calyx 5-parted, the segments imbricate; corolla declinate, the tube ventricose or campanulate, constricted above the ovary, the limb erect-patent, subbilabiate; stamens 4, didynamous, usually included, the anther cells divergent, confluent at the apex; capsule septicidally dehiscent; seeds very numerous, minute, foveolate-rugose.—All species of the genus are native in the Old World.

Digitalis purpurea L. *Digital.* A European plant, well known for its medicinal properties—used chiefly as a heart stimulant; cultivated commonly in gardens for ornament because of its large, brilliantly colored flowers. It has become perfectly established in pastures of Irazú, at 2,200–3,000 meters.

ESCOBEDIA Ruiz & Pavón

Rough-pubescent, erect, perennial herbs, simple or sparsely branched; leaves opposite, sessile, narrow; flowers large, white, axillary, pedicellate; calyx tubular, the lobes small; stamens 4; capsule ellipsoid.—Three other species are reported from Central America.

Escobedia grandiflora (L. f.) Kuntze. Grassy places, region of Cartago; region of San Ramón, roadsides and pastures at about 1,000 meters. Extending to Colombia and Ecuador. A stout herb about a meter high, puberulent or almost glabrous; leaves oblong-lanceolate, serrate or entire, 7–15 cm. long; bractlets inserted near the middle of the pedicel; calyx 2.5–4 cm. long; corolla 10 cm. long or more.

Escobedia reticulata Pennell, Proc. Acad. Phila. 83: 420. *pl. 37, f. 7.* 1931. Ciénaga de Agua Buena, Cañas Gordas, 1,100 meters, *Pittier 11118.* Two other collections are known, collected between Boruca and Térraba. Endemic. Leaves oblong-ovate, acute; bractlets inserted near the apex of the pedicel.

HEMICHAENA Benth.

The genus consists of a single species.

Hemichaena fruticosa Benth. Occasional in moist places in the forests of Dota, 1,600–2,500 meters; La Cruz de Alajuelita, 1,800 meters. Guatemala and Chiapas. A densely pubescent herb a meter high, the stems terete, simple; leaves opposite, sessile, cordate at the base, acuminate, serrate; flowers yellow, 4–5 cm. long, in axillary, pedunculate cymes; calyx green, tubular-campanulate, the lobes narrow; corolla somewhat bilabiate; stamens 4; fruit capsular, as long as the calyx. A showy and handsome plant because of its large, bright yellow flowers.

ILYSANTHES Raf.

Small, annual or perennial herbs of wet soil; leaves small, opposite, mostly dentate and sessile; flowers small, pedunculate, solitary in the leaf axils; calyx 5-parted, the segments narrow; corolla irregu-

lar, the tube somewhat dilated above, the limb bilabiate; fertile stamens 2, included, the anther sacs divergent, accompanied by 2 sterile stamens; capsule septicidally dehiscent; seeds numerous, rugose.—No other species are known from Central America.

Ilysanthes inaequalis (Walt.) Pennell. Collected at Pitajaya, and doubtless elsewhere in marshy places. A plant of wide distribution in America. A small annual, 5–30 cm. high, glabrous; leaves sessile, opposite, entire or denticulate; flowers minute, white, the pedicels long and slender; sepals almost distinct.

LAMOUROUXIA HBK.

Perennial herbs, erect or sometimes scandent; leaves opposite, sessile or petiolate, serrate; flowers red, large and showy, in paniculate racemes or spikes; calyx campanulate, 4-lobate; corolla tubular, narrow, bilabiate, the lips very short; stamens 4; capsule ovoid.—Other Central American species occur in Guatemala.

Lamourouxia Gutierrezii Oerst. Vid. Medd. Kjoebenhavn 29. 1853. Cerros de Candelaria, *Oersted 10* (photo. seen of type, ex herb. Copenhagen). Frequent in thickets of the central region, 1,200–1,800 meters; region of San Ramón. Panama. An erect herb, 1–1.5 meters high; leaves lance-elliptic, 1–2 cm. long, acute or obtuse, acute at the base, rough; calyx pilose; corolla 4.5 cm. long, tomentose.

Lamourouxia lanceolata Benth. Frequent in thickets, regions of Cartago and Dota, 1,400–2,500 meters; region of El General. Extending to southern Mexico. Plants branched, brittle, sometimes scandent and as much as 3 meters long; leaves narrowly lanceolate, short-petiolate, 2–4 cm. long, almost glabrous; calyx glabrous; corolla 3.5–4 cm. long.

Lamourouxia viscosa HBK. Vicinity of Las Cóncavas, south of Cartago; also at San Ramón and near Escazú. Ranging to Mexico. An erect herb, densely pubescent and somewhat tomentose; leaves sessile, cordate or rounded at the base, ovate; calyx pilose; corolla 3.5 cm. long.

LEUCOCARPUS Don

Tall herbs, the stems 4-angled and narrowly winged; leaves opposite, cordate and clasping at the base, serrulate; flowers in short-pedunculate, axillary cymes; calyx tubular-campanulate, 5-costate, short-dentate; corolla tube elongate, ampliate above, the

lips spreading, the posterior one exterior in bud; stamens 4, didynamous, included, the anther sacs distinct, divergent; fruit globose, baccate; seeds numerous, minute, reticulate.—A single species is found in Central America.

Leucocarpus perfoliatus (HBK.) Benth. *L. alatus* Don. In thickets, often on the banks of small streams, central region at 1,100–1,800 meters. Mexico to Bolivia. A somewhat fleshy, erect herb, 1 meter high or less, glabrous; leaves sessile, narrowly lanceolate, large, acuminate, serrate; flowers subumbellate in the leaf axils, pedicellate; calyx campanulate, the lobes narrow; corolla white or yellowish, 1.5 cm. long, the tube broad, the lobes small; fruit a white, globose berry 1 cm. or more in diameter. Easy of recognition in the family by its white, fleshy, not capsular fruit.

LINARIA Juss.

Herbs, the leaves chiefly opposite, entire or dentate, sometimes lobate; flowers solitary in the leaf axils or forming terminal racemes or spikes; calyx 5-parted, the segments imbricate; corolla tube calcarate anteriorly at the base, the posterior lobe erect, bilobate, the anterior lobe spreading, 3-lobate; stamens 4, didynamous, included, the anther cells distinct, parallel; capsule dehiscent by apical pores; seeds sometimes winged.—No species of the genus is known to be native in Central America.

Linaria Cymbalaria (L.) Mill. Collected at San José, *M. Valerio 1292*, probably in cultivation. Native of Europe. Plants perennial, glabrous, prostrate; leaves reniform, succulent, 3–5-lobate, long-petiolate; flowers small, axillary, blue or lilac.

MAURANDYA Ortega

Scandent herbs; leaves more or less triangular, long-petiolate; flowers large, axillary; sepals partly united; corolla bilabiate; stamens 4; fruit capsular.—It is probable that there are no native species of the genus in Central America.

Maurandya Barclayana Lindl. *Telégrafo.* Cultivated in the Meseta Central as an ornamental plant. Native of Mexico. A large vine, almost glabrous; leaves small, hastate-triangular, acuminate; flowers pink or purple, 3 cm. long; calyx lobes very narrow.

Maurandya erubescens (Don) Gray. An ornamental garden plant. Native of Mexico. Leaves ovate-triangular, soft-pubescent, dentate; flowers pink, 6–7 cm. long; sepals large and broad.

MAZUS Lour.

Low herbs, the lower leaves opposite, the upper alternate, crenate or dentate; flowers in terminal, somewhat secund racemes, small, the pedicels subtended by minute bracts or ebracteolate; calyx broadly campanulate, 5-dentate; corolla tube short or elongate, the posterior lip erect, shallowly bifid, the anterior one much larger, spreading, trifid; stamens 4, didynamous, the anther sacs divaricate; capsule globose or compressed, loculicidally dehiscent; seeds minute, very numerous.—No species is native in America.

Mazus japonicus (Thunb.) Kuntze. An Asiatic plant, naturalized in grassy places about San José. An herb 10 cm. high or less; leaves mostly basal, petiolate, obovate, crenulate; flowers small, pink or violet, racemose; calyx deeply lobate, 4 mm. long.

PENTSTEMON Ait.

Perennial herbs, the leaves opposite; flowers usually large and showy, forming a terminal, leafy or bracteate panicle or thyrse; calyx 5-parted, the segments imbricate; corolla tube usually elongate, sometimes ventricose, the limb bilabiate; stamens 4, didynamous, shorter than the corolla, the anthers glabrous or lanate, the cells distinct or confluent at the apex, a sterile stamen or staminodium also present; capsule septicidally dehiscent; seeds numerous.—Other species are native in northern Central America.

Pentstemon gentianoides (HBK.) Don. Sometimes cultivated for ornament in gardens, but not common. Native of Guatemala and Mexico. An erect, perennial herb, almost glabrous, forming dense clumps; leaves sessile, entire or serrulate, narrowly long-acuminate; flowers purple, 3 cm. long, arranged in a dense, narrow panicle. A beautiful and showy plant because of its abundance of large, brightly colored flowers.

RUSSELIA Jacq.

Erect, perennial herbs, the branches angulate; leaves opposite or ternate, broadly ovate, sessile or nearly so, crenate or serrate, usually furnished with resinous glands; flowers bright red, cymose and axillary or forming a terminal panicle; calyx 5-lobate; corolla tubular, the 5 lobes very short, rounded; stamens 5; fruit capsular. —Other species are known from Central America.

Russelia equisetiformis Schlecht. & Cham. *R. juncea* Zucc. An ornamental plant of gardens. Perhaps native of Mexico, but

probably unknown in a wild state. A glabrous herb about a meter high, the branches 6-angulate; leaves few and caducous; flowers 2 cm. long, forming a large panicle, the pedicels greatly elongate. An ornamental plant well known almost everywhere in Central America. It is known usually by the name Lluvia de coral.

Russelia sarmentosa Jacq. In thickets, Meseta Central and Pacific slope. Extending to Cuba and Mexico. An erect herb, glabrous or somewhat pubescent, the branches 4-angulate; corolla 1 cm. long; flowers in small, axillary cymes.

Russelia verticillata HBK. *Coralillo.* In thickets, Meseta Central to Pacific coast; region of San Ramón. Panama to Mexico. An erect herb, a meter or less in height; branches 6-angulate; corolla 1.5 cm. long.

SCOPARIA L.

Herbs or low shrubs, usually branched; leaves opposite or verticillate, punctate; flowers very small, ebracteate, solitary or geminate in the leaf axils; calyx 4-parted, the segments imbricate; corolla almost rotate, 4-lobate, densely barbate in the throat, the lobes subequal; stamens 4, subequal, the anther sacs distinct, parallel or divergent; capsule septicidally dehiscent; seeds numerous, angulate.—One or two other species may extend to Central America.

Scoparia dulcis L. *Mastuerzo, Escobilla amarga, Escoba de Castilla.* Meseta Central to the coasts, abundant about dwellings and in waste ground. Almost pantropic. A densely branched, erect herb, nearly glabrous, a meter or less in height; leaves small, ovate or lanceolate, dentate; flowers very small, white, pedicellate. Pittier states that a decoction of the leaves is very bitter, and possesses stomachic properties, and that an infusion of the plant is employed in treating diseases of women.

SIBTHORPIA L.

Prostrate, pubescent herbs, usually rooting at the nodes; leaves alternate, petiolate, orbicular-reniform, crenate or pinnatifid; flowers very small, axillary, solitary or fasciculate, ebracteolate; calyx campanulate, 4–8-lobate, the lobes subequal; corolla tube short, or the corolla almost rotate, the lobes of the limb subequal, spreading; stamens as many as the corolla lobes or 1 fewer, the anthers sagittate; capsule compressed, loculicidally dehiscent; seeds tuberculate-rugose.—A single species is native in North America.

Sibthorpia pichinchensis HBK. Common in forests, meadows, and paramos of the upper slopes of the mountains, 1,600–3,000 meters. Mexico to the South American Andes. A slender, prostrate herb, pubescent, the stems rooting at the nodes; leaves reniform, 1–2 cm. wide, crenate-lobulate, the petioles elongate; flowers very small, white or pale violaceous, the pedicels long and slender. Cufodontis has referred the Costa Rican plant to *S. retusa* HBK. It may well be that with monographic studies of the genus it will be possible to recognize more than one species, but I am unable to find characters for distinguishing the species named. The plant resembles in appearance some of the species of *Hydrocotyle* (Umbelliferae), with which it is often confused in herbaria.

STEMODIA L.

Annual or perennial herbs, the leaves broad, opposite or verticillate; flowers small or medium-sized, axillary or in bracteate spikes or racemes; calyx 5-parted, the segments almost equal; corolla with a cylindric tube and a bilabiate limb; stamens 4; fruit capsular.

Stemodia durantifolia (L.) Sw. Waste places of the tierra caliente. A species of wide distribution, but not common in Central America. An erect, branched herb, 60 cm. high or less, viscid-pubescent; leaves sessile, oblong or lanceolate, serrate; flowers small, purple, in bracted spikes.

Stemodia peduncularis Benth. *S. angulata* Oerst. Vid. Medd. Kjoebenhavn 22. 1853 (Cartago, *Oersted*). Common in forests of the central region, 1,100–2,400 meters; region of San Ramón. Extending to Mexico. Plants with elongate, procumbent stems, pubescent; leaves petiolate, broadly ovate, obtuse or acute, crenate; flowers white, 1.5 cm. long, the pedicels often longer than the leaves, filiform.

Stemodia verticillata (Mill.) Sprague. *Hierba santa. S. parviflora* Ait. Common in waste places, especially about dwellings. Meseta Central to the coasts. A species of wide distribution in tropical America. Plants annual, branched, 5–15 cm. high, viscid-pubescent; leaves opposite or verticillate, small, petiolate, broadly ovate, obtuse, crenate; flowers very small, axillary, fasciculate, short-pedicellate. It is reported that the plant is employed as a remedy for toothache, on which it probably has no more than psychological effects.

TORENIA L.

Small, annual herbs, branched, erect or procumbent; leaves opposite, small, ovate or rounded, crenate, petiolate; flowers small, axillary, the pedicels elongate; calyx tubular, 5-dentate; corolla bilabiate; fruit capsular, equaling or shorter than the calyx.

Torenia crustacea (L.) Cham. & Schlecht. A species of wide distribution in tropical America. Although I have seen no Costa Rican specimens, there is no doubt that it occurs in the Atlantic coast. Plants glabrous, 10 cm. high or less; calyx 3 mm. long; corolla purple.

Torenia Fournieri Linden. Often planted in gardens for ornament. Probably native of Asia. Plants erect and branched, the leaves petiolate, ovate, serrate, acute; calyx with broad wings, 1.5–2 cm. long; corolla about 3 cm. long, purple and black-purple.

Torenia Thouarsii (Cham. & Schlecht.) Kuntze. Pastures of the Changuinola Valley. A species of wide distribution. Calyx 6 mm. long; corolla white; plants larger than in the first species.

VANDELLIA L.

Small, branched, annual herbs; leaves opposite, dentate; flowers very small, axillary, solitary; calyx 5-dentate, the teeth slightly unequal; corolla bilabiate, the posterior lip exterior in bud; stamens 4, didynamous, the anther sacs approximate; capsule narrow, longer than the calyx.—A single species is found in Central America.

Vandellia diffusa L. Moist, grassy places, Meseta Central to the coasts; region of San Ramón. A species of wide distribution, probably introduced from the Old World. A branched herb, the stems sometimes rooting at the nodes, pubescent; leaves very shortly petiolate, rounded-ovate, crenulate; flowers almost sessile, 6–7 mm. long; calyx tubular, the teeth narrow and attenuate.

VERONICA L. Speedwell

Small, annual or perennial herbs, the leaves opposite, small, crenate; flowers small, axillary or in terminal racemes; calyx 4-parted; corolla rotate, 4-lobate; stamens 2; capsule compressed, emarginate.—No species is native in Central America, but there are indigenous species in Mexico.

Veronica arvensis L. A European plant, naturalized in pastures of the Volcano of Turrialba, and probably in those of the other

central volcanoes. A pubescent annual; leaves broadly ovate, the lower ones petiolate; flowers axillary, short-pedicellate, bluish.

Veronica polita Fries. In pastures, Cerros de Palmira de Alfaro Ruiz, 1,785 meters, *Brenes 4149*. Native of Europe, but naturalized in various parts of temperate America. A villous or pilose, branched annual; leaves broadly ovate or rounded-ovate, slender-petiolate, coarsely crenate-dentate; flowers on very long, slender pedicels, blue.

Veronica serpyllifolia L. Frequent in meadows of Turrialba. Naturalized from Europe. Plants perennial, puberulent or glabrous; leaves short-petiolate, oval; flowers blue, in terminal racemes.

BIGNONIACEAE. Trumpet-vine Family

Trees, shrubs, or vines, rarely herbaceous; leaves chiefly opposite, often tendril-bearing, simple or compound; flowers large and showy, variously arranged, more or less irregular; calyx inferior, gamosepalous; corolla gamopetalous, 5-lobate, somewhat bilabiate; fertile stamens 2 or 4, inserted on the tube of the corolla alternate with the lobes, the anthers 2-celled, their sacs longitudinally rimose; disk usually present, annular or cupuliform; ovary commonly 2-celled, the placentae parietal or affixed to the partition wall of the ovary, the ovules numerous, horizontal; fruit a 2-valvate capsule, or sometimes baccate and indehiscent; seeds compressed, often winged.—A few other genera are known from Central America. The family, as represented in this region, is still but imperfectly understood, chiefly because of the slow accumulation of adequate material for study. In the case of the scandent plants, the blooming period seems to be short. It is therefore highly desirable and important that the plants be collected freely, and whenever found in flower or fruit, except in the case of a few of the better known species.

The genus *Adenocalymma* has been reported from Costa Rica, and may be represented here, but I have seen no material definitely referable to it.

AMPHILOPHIUM HBK.

Woody vines; leaves opposite, petiolate, 2–3-foliolate, one of the leaflets often replaced by a tendril, the pubescence at least in part lepidote and often stellate; flowers large, in terminal panicles; calyx tube broadly campanulate, the limb spreading, undulate, with interior, lobelike appendages; corolla tube cylindric, straight, the limb bilabiate; stamens 4, included; disk large, annular; capsule

oblong, somewhat compressed; seeds winged.—One other species is known from Central America.

Amphilophium oxylophium Donn. Smith, Bot. Gaz. 31: 119. 1901. Tucurrique, 630 meters, *Tonduz 13045*. Stipules 10–12 mm. long, deciduous; leaflets 2, short-petiolulate, ovate-cordate, 7–12 cm. long, abruptly acuminate, appressed-pilose above with simple hairs, lepidote beneath, pale, tomentose; calyx lepidote, the tube 8 mm. long, densely pilose, the outer lobes 5–6 mm. long, the inner ones half as long; corolla glabrous, 2.5 cm. long. I have seen no representation of this species.

Amphilophium paniculatum (L.) HBK. var. **molle** (Schlecht. & Cham.) Standl., var. nov. *Cucharilla. A. molle* Schlecht. & Cham. Linnaea 5: 120. 1830. Thickets of the central region, and in the region of San Ramón; Guanacaste; probably also in the tierra caliente. Ranging to Mexico; typical form of the species widely distributed in tropical America, and perhaps occurring in Costa Rica. Usually a small vine; leaflets generally 2, rounded-ovate, entire, mostly 7–12 cm. long, abruptly short-acuminate, cordate or truncate at the base, lepidote, especially beneath, minute stellate-puberulent above or almost glabrous, densely stellate-tomentulose beneath with very small hairs; panicles few- or many-flowered, 10–20 cm. long; calyx tube 5 mm. long, lepidote and stellate-puberulent, the lobes short and rounded; corolla pink or purple, about 3 cm. long, glabrous; capsules about 6 cm. long and 3.5 cm. wide, rounded at each end. I have always assumed that *A. molle* was a valid species, differing from *A. paniculatum* in the abundant, stellate tomentum of the lower leaf surface, the surface in *A. paniculatum* being merely lepidote, with sometimes long hairs along the nerves. However, after finding leaves with both types of pubescence upon the same plant, it seems impossible to regard *A. molle* as more than a variety of *A. paniculatum*, the differences in pubescence being, apparently, scarcely more than a matter of degree.

ANEMOPAEGMA Mart.

Woody vines, glabrous or with pubescence of simple hairs; leaves usually bifoliolate, often with a terminal tendril, the leaflets petiolulate, entire; pseudostipules usually present, commonly broad and rounded, foliaceous; flowers large, in axillary or terminal racemes; calyx coriaceous, truncate or minutely dentate, eglandular outside; corolla elongate-funnelform, the lobes rounded, somewhat unequal, usually tomentulose outside; stamens included, the anthers

glabrous; disk pulvinate; capsule ovate or elliptic, compressed, smooth, the valves plane, coriaceous or ligneous; seeds winged.—At least two other species have been reported from Central America.

Anemopaegma punctulatum Pitt. & Standl. Thickets of the tierra caliente. Panama. A large, slender vine, the branches more or less angulate, at least in age; leaflets elliptic-oblong, 8–14 cm. long, acute or acuminate, acute or obtuse at the base, green when dried, glabrous, puncticulate, especially beneath; flowers mostly geminate or ternate in the leaf axils, on peduncles 1–1.5 cm. long; calyx 9–13 mm. long, glabrous, punctate, truncate; corolla pale yellow, 7–8 cm. long, glabrous outside. Costa Rican material that has been referred to *A. Vargasianum* DC. is probably referable to the present species.

Anemopaegma Tonduzianum Kraenzlin, Repert. Sp. Nov. 17: 116. 1921. Roadside thickets, Nicoya, *Tonduz 13912*. Known only from the original collection. Leaflets broadly oblong to broadly elliptic-ovate, 6–10 cm. long, abruptly acute or short-acuminate, rounded or very obtuse at the base, sparsely pilose above, villous beneath; calyx 9 mm. long, truncate, densely ferruginous-villous at the base, glabrous above; corolla pink, 4 cm. long, sparsely pilose. This plant, of which I have seen only a photograph, is scarcely referable to *Anemopaegma*, but from the photograph alone I am unable to decide where it should be placed. It is not improbable that it is an *Arrabidaea*.

ARRABIDAEA DC.

Woody vines, glabrous, pilose, or tomentose; leaves mostly bifoliolate, often with a simple, terminal tendril, the leaflets mostly subcoriaceous, petiolulate, entire; pseudostipules inconspicuous or none; flowers large or rather small, chiefly in terminal, often large panicles; calyx campanulate or subtubular, truncate or dentate, generally eglandular; corolla commonly funnelform and tomentose outside; stamens included; disk pulvinate or cupuliform; capsule elongate-linear, compressed, the valves plane, often 1-nerved, coriaceous; seeds winged.—Several other species are known from Central America.

Arrabidaea dichasia Donn. Smith. Reported from the regions of Carrillo and Boruca, Pacific tierra caliente. Honduras. Leaflets obovate-elliptic, 10–12 cm. long, abruptly acuminate, acute at the base, concolorous; calyx campanulate, minutely glandular-lepidote, 6 mm. long; corolla 5.5–7 cm. long, velutinous outside. I have seen no material of this species.

Arrabidaea pachycalyx Sprague. Thickets of the Pacific tierra caliente. Extending to Colombia. A large vine with pale branches; leaflets oblong-ovate to broadly ovate, abruptly acute, usually truncate or broadly rounded at the base, green on the upper surface and glabrous or nearly so, whitish beneath and covered with a very minute, pale tomentum; panicles commonly large and many-flowered; calyx truncate, 4–5 mm. long, minutely pale-tomentulose; corolla purple, 3 cm. long, tomentulose outside; capsules about 30 cm. long and 1 cm. wide, sometimes much shorter. This vine is a showy one, visible from a long distance, during its brief blooming period. Costa Rican material referred to *A. Chica* Verl. probably belongs here.

Arrabidaea rhodothyrsus Kraenzlin, Repert. Sp. Nov. 17: 20. 1921. Thickets near Nicoya, *Tonduz 13643* (photo. seen of type, in herb. Berlin). Thickets of Guanacaste. Endemic. Leaflets ovate-oblong to ovate-elliptic, 18 cm. long and 11 cm. wide or smaller, acute or abruptly short-acuminate, cordate or rounded at the base, short-pilose; calyx subentire, 3 mm. long; corolla pink or purple, 2 cm. long, villous outside.

BIGNONIA L.

Large, slender, woody vines; leaves with 2 entire leaflets and a 3-forked tendril, the branches of the tendril each terminating in a small, sharp, curved, horny hook, the leaves blackening in drying; flowers large, yellow, solitary or in few-flowered clusters in the leaf axils, slender-pedicellate; calyx membranous, green, campanulate, the margin crenate-lobate and oblique; corolla funnelform-campanulate, slightly curved, the broad limb unequally 5-lobate; stamens 4, included; disk annular; capsule linear, compressed; seeds winged.—No other species are known certainly from Central America.

Bignonia Unguis-cati L. Frequent in forests of the tierra caliente, ascending to the region of San Ramón. Widely distributed in tropical America. Plants slender, glabrous or nearly so, the branches terete; leaflets ovate to oblong or obovate, mostly 5–10 cm. long, acute to narrowly long-acuminate, often lustrous, acute or obtuse at the base; peduncles 1–3 cm. long; calyx 1–1.5 cm. long; corolla 5–8 cm. long; capsules 30–40 cm. long, 12–14 mm. wide. Much more common than adult plants of this species are juvenile plants, growing on tree trunks and fence posts, over which they creep by tightly adhering rootlets. These juvenile plants have leaves very unlike the normal ones, the leaflets often averaging only 1 cm. in length, and being obtuse or rounded at the apex.

CALLICHLAMYS Miq.

Woody vines; leaves ternate, or the terminal leaflet abortive; inflorescence racemose, usually axillary, the flowers very large, bracteate and bibracteolate; calyx inflated-campanulate, irregularly ruptured in anthesis; corolla funnelform, the 5 lobes subequal, crispate or undulate; disk broadly conic, glabrous; capsule very large, oblong, obtuse, woody; seeds broadly winged.—A single species occurs in Central America.

Callichlamys latifolia (A. Rich.) Schum. Region of San Ramón, and doubtless elsewhere. British Honduras to Brazil. Leaflets broadly elliptic or oblong, mostly 10–14 cm. long, short-acuminate, acute to rounded at the base, glabrous or nearly so, entire; inflorescence shorter than the leaves, the rachis farinose-tomentulose or glabrate; calyx 3.5–4 cm. long, colored; corolla yellow, glabrous, 8–9 cm. long; capsule 13–15 cm. long, 6–6.5 cm. wide, glabrous; seeds 5–10 cm. long and 4–4.5 cm. wide. This plant must be an exceedingly showy one when in flower.

CLYTOSTOMA Miers

Woody vines, glabrous or nearly so; leaves mostly bifoliolate, often with a terminal tendril, the leaflets petiolulate, entire; pseudo-stipules none or small and inconspicuous; flowers few, lateral or terminal, solitary or racemose, large; calyx campanulate or turbinate, 5-dentate, eglandular outside; corolla campanulate-tubular, the 5 lobes slightly unequal; stamens included, the anthers glabrous; disk short, crenate; ovary muricate; capsule linear-oblong to orbicular, subcompressed, covered with long, spreading spines, the valves ligneous; seeds winged.—Two other species are recorded for Central America.

Clytostoma callistegioides (Cham.) Bureau. Planted in the garden of Doña Amparo de Zeledón, San José. Native of Brazil and Paraguay. A slender vine; leaflets oblong or obovate-oblong, somewhat oblique, acute or short-acuminate, subacute at base, glabrous; flowers solitary or binate, long-pedicellate; calyx 6–7 mm. long, the 5 teeth filiform, 4–5 mm. long; corolla purple, 5–7 cm. long, minutely puberulent outside; capsule 7–8 cm. long, 4–4.5 cm. wide.

Clytostoma isthmicum Pittier. Thickets of the tierra caliente; Guanacaste. Panama. A slender vine, the branches tetragonous; leaflets oblong to oblong-ovate, 7–15 cm. long, acute or acuminate, acute at the base, glabrous; racemes 1–5-flowered, the flowers long-

pedicellate; calyx truncate and minutely 5-denticulate, 4.5 mm. long; corolla pale pink, 5–6 cm. long, sparsely lepidote or puberulent outside; capsule suborbicular, about 5 cm. long.

CYDISTA Miers

Woody vines, glabrous or pubescent; leaves bifoliolate, often with a terminal tendril, the leaflets entire; flowers large, in terminal or axillary, few-flowered racemes; calyx campanulate, truncate or minutely and remotely dentate; corolla funnelform-campanulate, the large lobes rounded; stamens included, didynamous; disk none; capsule elongate-linear, compressed; seeds winged.—Probably no other species occurs in Central America.

Cydista aequinoctialis (L.) Miers. Thickets of the Pacific tierra caliente. Widely distributed in tropical America. A large or small vine with slender branches; leaflets ovate to ovate-elliptic, 7–15 cm. long, coriaceous, dark when dried, acute or acuminate, rounded or obtuse at the base, lustrous, sparsely and minutely lepidote when young but in age almost wholly glabrous, sometimes pilose beneath along the costa; racemes as much as 20 cm. long, the flowers slender-pedicellate; calyx 8 mm. long, minutely lepidote or glabrous; corolla white or pink, usually 4–6 cm. long, densely lepidote; capsule 20–30 cm. long, 1 cm. wide. The crushed leaves have the odor of garlic, hence the common name of Ajillo applied to the plant in Salvador.

Cydista pubescens Blake. *Jalapa.* Thickets of Guanacaste. Panama to Mexico. Similar to the preceding species, but the leaflets pilose on the upper surface and densely and softly pilose with rather long hairs on the lower surface; calyx pilose or hispidulous; corolla pink. Probably better treated as a variety of *C. aequinoctialis,* but the abundant pubescence on almost all parts gives the plant a different aspect, and it may well be that careful study will prove the existence of other differentiating characters besides mere pubescence.

CRESCENTIA L.

Trees; leaves simple or palmately compound, usually fasciculate, glabrous; flowers large, solitary or clustered, axillary or more often lateral, and often borne on the larger branches or trunk; calyx coriaceous, closed in bud, bilobate or 5-parted in anthesis; corolla large, with a broad tube and a somewhat oblique, 5-lobate limb; stamens 4, didynamous, included or partially exserted; disk annular;

ovary 1-celled; fruit globose or oval, very large, indehiscent, with a thick, hard shell; seeds numerous, compressed, not winged.—One other species grows in Guatemala.

Crescentia Cujete L. *Jícaro, Calabacero.* Frequent in the Pacific tierra caliente, in some places forming dense stands or *jícarales;* common in Guanacaste; often planted or naturalized elsewhere, as in the Meseta Central, and doubtless also on the Atlantic slope. Widely distributed in tropical America. A tree, sometimes 10 meters high, with a thick, short trunk and a spreading, often depressed crown, the branches thick and nodose, pale; leaves clustered on the enlarged nodes, spatulate or oblanceolate, 5–15 cm. long, obtuse to short-acuminate, almost sessile; flowers on short, stout peduncles; calyx 2–2.5 cm. long, the lobes broad and rounded; corolla dull greenish purple, 5–8 cm. long. The tree is a somewhat fantastic one in appearance, certain to attract the attention of a visitor from temperate regions because of its habit of bearing the odd flowers and the huge fruits on the trunk or along the larger branches. The fruits vary greatly in size and shape. In the more common form the fruits are oval and about 15 cm. long, but very often they are globose or somewhat depressed and as much as 30 cm. in diameter. In the latter case one wonders at first how a tree can support such a load of fruits, that suggest pumpkins, although they are green rather than yellow. The shells of the fruits have been of great importance in household economy since the earliest human settlements, for they are used almost universally in Mexico and Central America for making cups, bottles, and all sorts of kitchen utensils. The cups, particularly those formerly used and still so employed in some localities for drinking chocolate, often are ornamented with intricate designs, and such cups must have been one of the first noteworthy articles to greet the eyes of Spanish explorers. The wood is brownish, often veined with darker color, moderately heavy, but tough and strong, rather coarse-textured, with a consistency suggesting elm (*Ulmus*); it is not durable, but is used for saddletrees, tool handles, and other small articles. In Costa Rica the oval fruits are called *guacales,* the globose or depressed ones *jícaras.* The pulp has purgative properties, and has been accused of causing abortion in cattle that eat the fallen fruits.

ENALLAGMA Baill.

Glabrous trees or shrubs; leaves alternate, simple, entire, broader than in *Crescentia,* short-petiolate; flowers large, terminal or axillary,

long-pedunculate, solitary or few-fasciculate; calyx closed in bud, bilobate in anthesis; corolla tube broad, the limb oblique, shallowly lobate; stamens 4, didynamous, included; disk annular; ovary 2-celled; fruit large, ellipsoid, indehiscent, with a woody or coriaceous shell; seeds numerous, compressed, not winged.—One other species is known from Central America.

Enallagma latifolia (Mill.) Small. *Cacao silvestre.* Occasional in the tierra caliente, usually in tidal swamps. Southern Mexico to West Indies and Venezuela. A glabrous tree of 10 meters or less, the bark smooth or shallowly fissured, the branches pale; leaves almost sessile, elliptic or obovate, 7–20 cm. long, abruptly acute, cuneate at the base; calyx 3 cm. long, cleft to the middle or more deeply; corolla 4–5 cm. long, purplish or yellowish, the limb margined with brown; fruit subglobose, smooth, 6–8 cm. long.

Enallagma sessilifolia (Donn. Smith) Standl., comb. nov. *Tabebuia sessilifolia* Donn. Smith, Bot. Gaz. 25: 156. 1898. *Neotuerckheimia gonoclada* Donn. Smith, Bot. Gaz. 47: 259. 1909 (forests of La Palma, Prov. San José, 1,460 meters, *Tonduz 12563; J. D. Smith 7384*). Forests of El Tablazo, 1,800 meters, *Tonduz 7937.* Frequent in forests of the central mountains, 1,300–2,200 meters; region of San Ramón. Panama. A tree of 5–8 meters, often branching near the base, the trunk as much as 40 cm. in diameter, the bark pale grayish brown, slightly roughened; leaves short-petiolate, narrowly oblong-oblanceolate, 15–30 cm. long, 4–7 cm. wide, short-acuminate, long-attenuate to the short and often very thick petiole, glabrous; calyx 2 cm. long; corolla pale yellow-green, 4 cm. long; fruits ellipsoid or oval, about 15 cm. long and 10 cm. in diameter, black when ripe. Squirrels are reported to eat the seeds. The Costa Rican tree has been confused with *E. Donnell-Smithii* (Sprague) Standl., of northern Central America. Mr. C. V. Morton has kindly examined the types of Captain Smith's two species, and confirms my suspicion, based upon reading of the descriptions, that the names are synonymous.

GODMANIA Hemsl.

Trees; leaves opposite, long-petiolate, digitately 5–9-foliolate, the leaflets petiolulate, entire; flowers rather small, white, yellowish, or pink, in axillary corymbs; calyx campanulate, 5-dentate; corolla funnelform-campanulate, ventricose, barbate within, the limb subbilabiate, the lobes broad and rounded; stamens 4, didynamous, included; disk annular; capsule cylindric, very long and slender,

costate; seeds with a long wing at each end.—One other species has been described from Brazil.

Godmania aesculifolia (HBK.) Standl. *Corteza de chivo. G. macrocarpa* Hemsl. Buenos Aires; region of San Ramón; at 900 meters or less. A tree of 5–8 meters; leaflets obovate to oblanceolate-oblong, 6–17 cm. long, often long-acuminate, attenuate to the base, softly short-pilose on both surfaces or sometimes glabrate; corolla about 1 cm. long, puberulent outside; capsule sometimes as much as 90 cm. long but usually much shorter, 1 cm. or less in diameter.

JACARANDA Juss.

Tall trees; leaves opposite, large, several times pinnate, with numerous small or large leaflets; flowers showy, blue, commonly in large panicles; calyx campanulate or tubular, truncate or irregularly lobate; corolla campanulate-funnelform, gibbous at the base, the 5 lobes subequal; disk obscure or none; ovary 2-celled; capsule orbicular or oblong, compressed, the valves thick-coriaceous or woody; seeds winged.—No other species are known from Central America.

Jacaranda Copaia (Aubl.) D. Don. *Gallinazo.* Frequent in the upper part of the Atlantic tierra caliente; region of El General. British Honduras to Brazil. A tall tree with very large leaves, the very numerous leaflets oblong or rhombic-oblong, obtuse to acuminate, cuneate at the base, 3.5–6 cm. long, glabrous or nearly so, the margins often revolute; panicles 25–40 cm. long; calyx 6 mm. long, minutely tomentulose; corolla 2.5 cm. long, densely and finely tomentose outside; capsule obovate, about 9 cm. long. Called Palo de buba in Panama. This is one of the most beautiful and showy trees of southern Central America when covered with the abundant panicles of blue flowers. The leaves are reported to attain a length of 1.5 meters. The wood is oatmeal-colored or dingy white, light and soft but firm, with straight, medium grain.

Jacaranda filicifolia (Anders.) D. Don. Forests of the Pacific coast, and probably elsewhere; sometimes planted as an ornamental tree. Ranging to Venezuela and the Guianas. A tall tree; leaflets subrhombic to lanceolate, mostly 7–15 mm. long, acute, acute to obtuse at the base, minutely pilose above and pilose beneath along the costa or glabrate; panicles mostly 5–7 cm. long; calyx 1.5 mm. long, minutely pilosulous; corolla 4–5 cm. long, glabrous outside; capsule suborbicular, 5–6 cm. long.

LUNDIA DC.

Woody vines, the branches terete; leaves 3-foliolate, or the terminal leaflet often replaced by a simple or trifurcate tendril, the leaflets petiolulate, entire; inflorescences small and umbelliform, sometimes paniculate, terminal and axillary, the flowers large; calyx closed in bud, ruptured in anthesis and truncate or irregularly 2–3-lobate, or cleft on one side, eglandular; corolla funnelform, the tube often narrow and elongate, the limb 5-lobate, the lobes subequal; disk none; fruit siliquiform, elongate; seeds winged.—Two other species have been described from Central America.

Lundia corymbifera (Vahl) Sandwith. *L. umbrosa* Bur. Santa Rosa de El General; El Coyolar; at 660 meters or less. Extending to Brazil. Leaflets ovate-oblong to broadly elliptic-ovate, 9–11 cm. long, caudate-acuminate, obtuse to cordate at the base, pilosulous on the nerves, puberulent on the margins; calyx turbinate-campanulate, 6–7 mm. long, pale when dried, truncate, minutely puberulent; corolla white, 4.5–5 cm. long, subtomentose outside; capsules about 20 cm. long and 2 cm. wide, subtomentose.

MACFADYENA DC.

Slender, woody vines, glabrous or pubescent with simple hairs; leaves mostly bifoliolate, the leaflets petiolulate, entire, the terminal leaflet often replaced by a tendril, this trifurcate at the apex, the branches each ending in a short, indurate hook; flowers large, yellow, in few-flowered, axillary inflorescences; calyx closed in bud, in anthesis cleft along one side or subbilobate, membranaceous, green; corolla campanulate-funnelform, the 5 lobes rounded, lepidote-glandular outside; stamens included; disk cupuliform; capsule linear, elongate, compressed, glabrous, the valves subligneous, unicostate; seeds winged.—A single species is known from Central America.

Macfadyena uncata (Andr.) Sprague & Sandw. *M. uncinata* DC. Reported from forests of the Atlantic tierra caliente. Mexico to Bolivia and Brazil. A slender vine, blackening in drying, glabrous or nearly so; leaflets oblong, 4–6 cm. long or larger, acuminate, sparsely and minutely pilose or glabrous, somewhat lepidote beneath; flowers axillary and solitary, on pedicels 1.5–2 cm. long; calyx 1.5–2 cm. long; corolla glabrous, 4.5–5 cm. long; capsule 12–15 cm. long.

MARTINELLA Baill.

Woody vines, the branches terete; leaves bifoliolate, often with a terminal, trifurcate tendril, the leaflets petiolulate, entire, sub-

coriaceous; pseudostipules none; flowers large, in lax, lateral racemes; calyx coriaceous, usually trilobate-bilabiate; corolla campanulate-funnelform, the 5 lobes rounded; stamens included; capsule linear or nearly so, acuminate at each end; seeds winged.—One other Central American species has been described, but probably is not properly referable to the genus.

Martinella obovata (HBK.) Baill. Thickets of the Pacific tierra caliente; region of San Ramón; Guanacaste. British Honduras to Brazil. A large vine; leaflets oblong to elliptic, often ovate, mostly 10–12 cm. long, thick, acute or acuminate, rounded or subcordate at the base, glabrous above, somewhat paler beneath, glandular-punctate and lepidote; racemes few-flowered, lax, often elongate; calyx 15 mm. long, glabrous but lepidote; corolla lilac or purple, about 3 cm. long; capsule 60–100 cm. long, 1–2 cm. wide.

PACHYPTERA DC.

Woody vines, the branches terete; leaves 2–3-foliolate, the terminal leaflet often replaced by a simple tendril, the leaflets petiolulate, subcoriaceous, entire; pseudostipules narrow and almost spinelike; flowers very large, in short, few-flowered, axillary racemes; calyx obliquely campanulate, repand-dentate; corolla clavate-funnelform, the tube very long and slender, the 5 short lobes rounded at the apex; stamens included, the anthers pubescent; capsule elongate, subcylindric, the valves costate; seeds winged.—A single species occurs in Central America.

Pachyptera Kerere (Aubl.) Sandwith. *P. foveolata* DC. *Tanaecium Zetekii* Standl. Puerto Jiménez, Golfo de Osa, Pacific coast, *Brenes 12166.* British Honduras to Brazil. A large vine; leaflets oblong to broadly oblong-elliptic, 8–18 cm. long, acute or abruptly acuminate, rounded or shallowly cordate at the base, glabrous; calyx 1 cm. long, minutely and densely tomentulose; corolla white, 7–8 cm. long; capsule about 13 cm. long and 2 cm. wide. Although *Tanaecium Zetekii*, clearly a species of *Pachyptera*, has been reduced by Sandwith to synonymy under *P. Kerere*, I suspect that the Central American plant may prove to be a distinct species. In all the numerous Central American specimens at hand, the strikingly long and narrow corollas are 7–8 cm. long, while in the South American plants, i. e., typical *P. Kerere*, the corollas are only 5 cm. long. I have not seen sufficient South American material to decide whether this difference is constant. If it is, I should consider the northern plant distinct.

PANDOREA Spach

Woody vines with pinnate leaves; flowers large and showy, in terminal panicles; calyx campanulate, small, 5-dentate; corolla salverform to subcampanulate, the 5 lobes broad, rounded; stamens included; disk pulvinate; capsule oblong, the valves thick, smooth; seeds winged.—The species are natives of the Old World.

Pandorea Riccasoliana (Tanfani) Baill. Planted occasionally for ornament. Native of South Africa. A slender vine; leaflets 9–11, serrate; flowers bright pink, 6 cm. long.

PARMENTIERA DC.

Trees, frequently armed with spines; leaves alternate or subopposite, digitately compound, most often trifoliolate; flowers large, greenish, pedunculate, commonly solitary or pedicellate on old wood; calyx closed in bud, in anthesis cleft along one side and spathelike; corolla tube dilated and subcampanulate, somewhat curved, the limb subbilabiate, 5-lobate; stamens 4; ovary 2-celled; fruit elongate, often very long, relatively slender, terete, indehiscent, smooth or costate, with a fleshy pericarp; seeds small, numerous, not winged. —One or two other species have been collected in Central America.

Parmentiera edulis DC. *Cuajilote.* Sometimes cultivated in the tierra caliente. Native of Mexico and perhaps of northern Central America. A tree 10 meters high or less, the branches armed with short, stout, incurved spines; leaves glabrous, long-petiolate, the petiole naked or narrowly winged; leaflets 3, ovate or obovate, mostly acute and entire, 3–8 cm. long; flowers greenish yellow, about 7 cm. long; fruit terete, fleshy, 10–16 cm. long and 2 cm. thick or larger. The fruit is edible, either raw or cooked, but of very inferior quality.

Parmentiera macrophylla Standl. Forests of the Atlantic tierra caliente (Monte Verde and Changuinola Valley). Adjacent Panama. A tree of 3.5–9 meters, the trunk 7–10 cm. in diameter; leaves long-petiolate, 3-foliolate, the leaflets long-petiolulate, narrowly elliptic to obovate-elliptic, 5–14 cm. long, acuminate or abruptly acuminate, acute and decurrent at the base, entire, glabrous above, paler beneath and whitish-lepidote, usually with small shelters for parasites in the axils of the nerves; flowers and fruits mostly borne from small pads on the main trunk; calyx 3.3 cm. long, glabrous; corolla glabrous, white, 5.5 cm. long. The fruits are described as looking "like a cacao pod." Called Wild calabash in Panama.

Parmentiera Valerii Standl. Journ. Wash. Acad. Sci. 17: 16. 1927. Wet forest near Naranjos Agrios, near Tilarán, Guanacaste, 700 meters, *Standley & Valerio 46411*. Known only from the original locality. A tree about 12 meters high, with a trunk 40 cm. in diameter; leaves short-petiolate, the leaflets 4–7, usually 5, slender-petiolulate, elliptic to obovate, 2.5–5 cm. long, acute, attenuate to cuneate at the base, entire, glabrous; flowers and fruits borne on the lower part of the trunk, the peduncles 2–2.5 cm. long; calyx green, 32–40 mm. long; corolla white, 6–7.5 cm. long, glabrous; immature fruit about 20 cm. long and 4 cm. thick, green, smooth. Only one tree of this species was found in the mountains of Tilarán. This was too large to be climbed, and it was only by spending some time in throwing sticks at the branches, far above the ground, that imperfect specimens of the young leaves could be obtained. The flowers and fruits, of course, were within easy reach. Probably the mature leaves much exceed the dimensions given in the present description.

PETASTOMA Miers

Woody vines; leaves bifoliolate, sometimes with a terminal, simple tendril, the leaflets entire, membranaceous or subcoriaceous; pseudostipules sometimes present; flowers large, in terminal or sometimes axillary panicles; calyx membranaceous, broadly campanulate or patelliform, the margin crenulate or minutely denticulate, spreading, eglandular; corolla campanulate-funnelform, the lobes subequal, densely tomentose outside; stamens didynamous, included; disk pulvinate; capsule elongate-linear, compressed, acute at each end; seeds winged.—Two or three other species are reported for Central America.

Petastoma patelliferum (Schlecht.) Miers. In thickets, Meseta Central to the Pacific coast, at 1,300 meters or less; region of San Ramón; Guanacaste. Mexico to Brazil. A large or small vine; leaflets elliptic to broadly ovate, 5–13 cm. long, abruptly short-acuminate, rounded at the base, densely or sparsely short-pilose or in age glabrate; calyx about 3 mm. long and 5 mm. broad, pilose or glabrate; corolla pale purple, 3.5–4 cm. long; capsule 20–30 cm. long, 10–13 mm. wide, glabrous. This species is easy of recognition by its corolla, which is densely and finely tomentose outside on the lobes, but quite glabrous below the lobes.

PITHECOCTENIUM Mart.

Small or large, woody vines; leaves bifoliolate or trifoliolate, often with a terminal tendril, the leaflets entire, petiolulate, more

or less coriaceous; pseudostipules usually absent; flowers large, in lax racemes or panicles; calyx campanulate, truncate or denticulate, eglandular; corolla campanulate or campanulate-funnelform, the lobes obtuse; stamens didynamous, included; disk pulvinate or short-cupular; capsule oblong, compressed, ligneous, the valves densely muricate; seeds broadly winged.—No other species are found in Central America.

Pithecoctenium echinatum (Jacq.) Schum. *Cucharilla, Bateíta, Peine de mico.* In thickets, Meseta Central and Pacific slope; region of San Ramón; at 1,200 meters or less. Mexico to Brazil. A small or large vine with angulate branches; leaves long-petiolate, the leaflets ovate or rounded-ovate, 6–10 cm. long, usually short-acuminate, truncate or cordate at the base, finely lepidote and usually rather densely short-pilose; calyx campanulate, truncate, almost 1 cm. long, densely tomentulose; corolla 4.5–5 cm. long, white, turning yellow in age, densely tomentulose outside; fruit 15–20 cm. long, 4.5–6.5 cm. wide, densely covered with large, sharp, hard tubercles. The large seeds, 6–8 cm. broad, are light in weight and float through the air, hence the names of Mariposas and Palomitas applied to them in some parts of Central America. The curious fruits, resembling graters, are distinctive for the genus.

PLEONOTOMA Miers

Scandent shrubs, the branches acutely tetragonous; leaves bifoliolate or twice compound, the tendrils trifurcate, the leaflets petiolulate, entire; pseudostipules present, usually large and conspicuous; flowers large, racemose or paniculate; calyx small, campanulate, 5-denticulate, sometimes glandular; corolla campanulate-funnelform or narrower, the lobes obtuse, subequal; stamens included; disk hemispheric or depressed; ovary lepidote, 2-celled; capsule elongate, linear or nearly so, compressed; seeds winged.—No other species are known from Central America.

Pleonotoma diversifolium (HBK.) Bur. & Schum. In thickets and forest, Guanacaste. Mexico to Venezuela. A slender vine; leaflets usually 2, broadly ovate or rounded-ovate, mostly 6–10 cm. long, abruptly short-acuminate, truncate or cordate at the base, glabrous; pseudostipules large and foliaceous, broadly ovate or rounded; calyx 4–5 mm. long; corolla light purple, 3–4 cm. long, minutely lepidote or sparsely tomentulose outside; capsules about 30 cm. long and 1 cm. wide, or larger, glabrous.

Pleonotoma variabile (Jacq.) Miers. Thickets of the Pacific tierra caliente. Ranging to Venezuela and the Guianas. A large vine; lower leaves biternate, the upper bifoliolate, the leaflets oblong or oblong-ovate, 7–9 cm. long, attenuate-acuminate, glabrous; pseudostipules linear or subspatulate; calyx glandular below the teeth, 3–3.5 mm. long; corolla white, with a yellow throat, 5.5–6 cm. long, glabrous outside.

PSEUDOCALYMMA Sampaio & Kuhlm.

Woody vines, glabrous or pubescent; leaves mostly bifoliolate, often with a terminal tendril, the leaflets petiolulate, entire; flowers large, in mostly axillary racemes or panicles; calyx coriaceous, campanulate, truncate or minutely 5-dentate, eglandular; corolla elongate-funnelform, the 5 lobes rounded, more or less unequal; stamens included, the anthers glabrous; disk pulvinate; capsule usually elongate-linear, compressed, the valves plane or convex; seeds winged.—A few other species probably occur in Central America.

Pseudocalymma macrocarpum (Donn. Smith) Sandwith. *Hosmeca. Adenocalymma Hosmeca* Pittier, Contr. U. S. Nat. Herb. 18: 256. 1917 (between Cangel and El Corozal, Guanacaste, *Otón Jiménez 374*). *Petastoma Tonduzianum* Kraenzlin, Repert. Sp. Nov. 17: 56. 1921 (thickets near Nicoya, *Tonduz 13830*). Thickets of Guanacaste. Extending northward to Campeche, and probably into Panama. Glabrous or nearly so; leaflets ovate to rounded-ovate, 6–10 cm. long, abruptly short-acuminate or acute, broadly rounded or obtuse at the base; inflorescences few- or many-flowered; calyx about 8 mm. long, truncate, glabrate, the margin densely ciliate; corolla 4.5–5 cm. long, pink, glabrous outside; capsule 30–50 cm. long, 1.5 cm. wide. The plant is said to have a strong odor of garlic.

PYROSTEGIA Presl

Woody vines, glabrous or nearly so; leaves usually bifoliolate, the tendrils trifurcate, the leaflets petiolulate, entire; pseudostipules inconspicuous; flowers large and showy, forming a terminal panicle; calyx turbinate or campanulate, minutely denticulate, lepidote; corolla long and narrow, the tube gradually narrowed toward the base, the rather long lobes narrow, more or less tomentose within; stamens exserted, didynamous; disk cupular; capsule elongate-linear, compressed glabrous; seeds broadly winged.—All the species of this genus are native in South America.

Pyrostegia ignea (Vell.) Presl. *Triquetraque. P. venusta* Miers. One of the common, cultivated, ornamental vines of Costa Rica, especially about the Meseta Central. Native of Brazil and Paraguay. A large vine; leaflets ovate to ovate-lanceolate, acuminate, lepidote, sparsely pilose beneath; calyx 6–7 mm. long; corolla orange, 5.5–7.5 cm. long; capsule 25–30 cm. long, 14–16 mm. wide. The vine is grown commonly in many parts of Central America. It is conspicuous because of its great abundance of vividly colored flowers.

SALDANHAEA Bureau

Woody vines; leaves usually trifoliolate, the leaflets petiolate, entire; flowers large, in small or large panicles; calyx turbinate-campanulate, 5-dentate, the teeth triangular, acute; corolla subbilabiate, with a narrow tube, the lobes obtuse, subequal, crispulate; stamens included; disk subannular, lobulate or entire; capsule elongate, siliquiform, the valves convex, woody; seeds winged.—The other species are South American.

Saldanhaea costaricensis Kraenzlin, Repert. Sp. Nov. 17: 124. 1921. Forests of Nicoya, *Tonduz 13929* (photo. seen of type, in herb. Berlin). Thickets of the Pacific tierra caliente. Panama; Guatemala and British Honduras. Leaves long-petiolate, 3-foliolate, the leaflets oblong to ovate-oblong or oval, 5–11 cm. long, thin, acute or abruptly acuminate, very obtuse to cuneate at the base, when young densely pilose, paler beneath, sometimes glabrate in age; inflorescences mostly arising from old branches, small or large; calyx stellate-puberulent, 6 mm. long; corolla bright pink, 3–5 cm. long or larger, stellate-tomentose outside.

SCHLEGELIA Miq.

Erect shrubs, usually epiphytic, sometimes subscandent, without tendrils; leaves simple, short-petiolate, entire, coriaceous; flowers large, usually in axillary fascicles, sometimes in terminal panicles or racemes; calyx campanulate, truncate or lobate; corolla funnelform or campanulate-turbinate, the limb 5-lobate; stamens included or short-exserted; disk none; fruit baccate, globose, subtended by the calyx; seeds surrounded by pulp, not winged.—One or two other species are known from Central America.

Schlegelia costaricensis Standl., sp. nov.—Frutex glaber, ramulis crassiusculis teretibus, internodiis elongatis; folia breviter petiolata coriacea, petiolo crasso ca. 1 cm. longo vel paullo ultra; lamina obovata vel obovato-oblonga 9–12.5 cm. longa 4–6.5 cm.

lata, apice abrupte breviter acuta vel tantum obtusa, basi inaequali subacuta, in sicco fusca vel brunnescens, supra lucida, costa nervisque prominentibus, subtus paullo pallidior, costa gracili prominente, nervis lateralibus utroque latere ca. 7 angulo lato abeuntibus subarcuatis irregularibus teneris prominulis, venis prominulis laxe reticulatis; flores (delapsi tantum visi) breviter pedicellati; calyx campanulatus 12 mm. longus in alabastro clausus 5-lobus, lobis ca. 5 mm. longis late ovatis abrupte acuminatis, intus ad margines dense minute tomentulosis; corolla fere 4 cm. longa extus dense minute viscido-tomentulosa, tubo 2 cm. longo fauce ca. 13 mm. lato, versus basin sensin angustato prope basin glabro, lobis magnis subaequalibus obovato-rotundatis apice late rotundatis ca. 13 mm. latis intus subdense viscido-puberulis; antherae breviter exsertae 3 mm. longae.—Cataratas de San Ramón, March, 1931, *Brenes 13570* (type in Herb. Field Mus.). *S. nicaraguensis* Standl., from the region of Braggman's Bluff, is similar but has a different calyx and very short corolla lobes.

SPATHODEA Beauv.

Tall trees; leaves large, pinnate, the leaflets petiolulate, entire; flowers very large, bright red or orange, usually preceding the leaves, in short, terminal racemes; calyx densely tomentose, ovoid-acuminate in bud, cleft along one side and spathelike in anthesis; corolla ventricose-campanulate, the limb subbilabiate, the 5 lobes broad and rounded; stamens short-exserted; disk pulvinate; capsule oblong-lanceolate, compressed, the valves thick-coriaceous; seeds winged.

Spathodea campanulata Beauv. Planted in the Parque Bolívar, San José, and probably elsewhere. Native of tropical Africa, but planted in recent years for ornament in various parts of Central America. Leaflets 7–17, ovate, acute; corolla 7–10 cm. long. Called Tulip tree in Panama. One of the showy trees of tropical regions because of its abundance of large, intensely colored flowers.

TABEBUIA Gómez

Trees or shrubs; leaves petiolate, digitately 1–7-foliolate, rarely simple; flowers large and showy, in terminal corymbs or panicles; calyx tubular or campanulate, dentate or cleft; corolla funnelform or funnelform-campanulate, the limb spreading, slightly bilabiate or almost regular, the lobes broad and rounded; stamens included; capsule linear or linear-oblong, the valves convex, coriaceous; seeds broadly winged.—One or two other species are known from Central America.

Tabebuia chrysantha (Jacq.) Nicholson. *Guayacán, Corteza, Corteza amarilla.* Forests of the Pacific tierra caliente; Guanacaste. Mexico to Venezuela. A small or large tree with pale, scaly bark; leaflets 5, broadly obovate to elliptic-oblong, 18 cm. long or usually much less, abruptly acuminate, very obtuse to subcordate at the base, usually entire, abundantly stellate-pubescent or glabrate, beneath often densely stellate-tomentose; flowers in dense, terminal, headlike clusters; calyx 1 cm. long, covered with long, short-barbate hairs; corolla bright yellow, 5–6.5 cm. long; capsules 20–30 cm. long or more, 12–15 mm. thick, subterete, smooth or tuberculate, stellate-tomentose or glabrate. Wood olive-brown, hard, heavy, tough, durable, strong, medium-textured, rather splintery, finishing smoothly. It is used locally for many purposes. The tree is conspicuous in flower because of its brilliant blossoms. It blooms when devoid of leaves. *Tabebuia Guayacan* (Seem.) Hemsl., a Panama species, has been reported from the Pacific slope of Costa Rica, but the material so reported is probably referable to the present species.

Tabebuia pentaphylla (L.) Hemsl. *Roble de sabana, Roble blanco, Guayacán. Couralia rosea* Donn. Smith. Frequent in many places on the Pacific slope, descending to the coast; region of San Ramón; found in various places about San José, but perhaps not native in the Meseta Central. Mexico to West Indies and Venezuela. A tree of 20 meters or less; leaflets 5, long-petiolulate, elliptic-oblong to elliptic or oblong-ovate, 20 cm. long or less, acute or acuminate, rounded to acute at the base, entire, minutely lepidote on both surfaces, but otherwise glabrous; flowers in small, lax, few-flowered corymbs; calyx 1.5 cm. long or larger, minutely lepidote; corolla 7–10 cm. long, varying from pale purple to almost white; capsules 20–35 cm. long or larger, 12 mm. in diameter. Wood brownish, with fine striping of dark brown, of medium density, strong, easy to work, holds its place well when manufactured, is fairly durable; used locally for furniture, interior trim, and many other purposes. This is one of the best known and most useful trees of Central America, common throughout most of the Pacific slope, and occurring also on the Atlantic watershed. In beauty it has few rivals. The trees often form pure stands of considerable extent, and when covered with their blossoms, during spring months, afford an exquisite display of color, suggestive of that of Japanese cherries in variation of tints.

TANAECIUM Swartz

Woody vines; leaves 2–3-foliolate, the terminal leaflet sometimes replaced by a single tendril, the leaflets petiolulate, entire;

flowers among the largest of the family, white, in terminal or lateral racemes; calyx coriaceous, tubular-campanulate, truncate and minutely denticulate, lepidote or glandular outside; corolla very long and narrow, the limb small, 5-lobate, the lobes subequal, obtuse; stamens included or exserted, the anthers glabrous; disk cylindric; capsule subcylindric or slightly compressed, elongate; seeds winged.—A single species is found in North America.

Tanaecium Jaroba Swartz. Thickets in the region of Limón. Nicaragua to Colombia and Jamaica. A large vine, glabrous or nearly so; leaflets usually 3, elliptic-oblong, 8–12 cm. long, abruptly short-acuminate, subacute at the base; flowers on long, stout pedicels; calyx narrow, 1 cm. long, bearing a few large glands, glabrous; corolla about 17 cm. long, densely and minutely tomentulose outside, the tube very slender, 1 cm. wide in the throat, the lobes 2 cm. long or less, furfuraceous-tomentulose within; stamens short-exserted. The plant is well marked by its extraordinarily long and slender corollas.

TECOMA Juss.

Erect shrubs or trees; leaves usually pinnate, the leaflets serrate; pseudostipules none; flowers large and showy, bright yellow, racemose or paniculate; calyx tubular-campanulate, 5-dentate; corolla campanulate-funnelform, the 5 lobes subequal, glabrous outside; stamens included; disk cupular, lobulate; capsule elongate, linear, compressed; seeds broadly winged.—A single species occurs in Central America.

Tecoma stans (L.) HBK. *Candelillo, Carboncillo, Vainilla. Stenolobium stans* Seem. In thickets and hedges, Meseta Central to the Pacific coast; region of San Ramón; often planted for ornament. Widely distributed in tropical America. A shrub or small tree, sometimes as much as 12 meters high; leaflets 5–13, linear-lanceolate to ovate-lanceolate or elliptic, acute or acuminate, serrate, glabrous beneath or sometimes tomentose; corolla 3.5–5 cm. long; capsule 10–20 cm. long, about 6 mm. wide. It seems to me rather questionable whether this species is native in Central America, since most often it grows in hedges or in other places about settlements. The clusters of bright yellow flowers are handsome, but the rather ragged habit of the plant as it usually grows detracts from its value as an ornamental shrub. The generic name is of interest, being derived from an Aztec or Nahuatl word signifying trumpet. The plant is easily recognized by its combination of yellow corollas and pinnate leaves.

TECOMARIA Fenzl

Shrubs, erect or scandent; leaves pinnate, the leaflets serrate; flowers large, in terminal racemes or panicles; calyx campanulate, 5-dentate; corolla with a long, narrow tube, tapering from apex to base, the limb small, somewhat bilabiate; stamens exserted; capsule linear, compressed; seeds winged.—No species are native in North America.

Tecomaria capensis (Thunb.) Fenzl. Planted frequently for ornament, at least in the Meseta Central. Native of South Africa. A small or large vine; leaflets 7–9, ovate or broadly elliptic, mostly about 2–3 cm. long, acute or acuminate, serrate, barbate beneath along the costa but otherwise glabrous or nearly so; corolla orange-red, about 4 cm. long, glabrous outside; capsule linear, 5 cm. long or less. A handsome vine, popular as an ornamental plant in most parts of Central America.

TOURRETTIA Foug.

Herbaceous, glabrous vines; leaves opposite, dichotomously or trichotomously digitate, the few segments membranaceous, petiolulate, serrate, the rachis terminating in a branched tendril or in a leaflet; flowers small, short-pedicellate, racemose-spicate, dimorphous, the upper sterile and deciduous, the lower partly fertile; calyx red, biparted, deciduous, the lobes entire; corolla tube slender-tubular, shorter than the calyx, the limb unequally bilabiate; disk annular; ovary 4-celled; capsule ovoid-oblong, inflated, covered with long, spreading, uncinate spines; seeds narrowly winged.—The genus consists of a single species. The plant has little resemblance to other members of the Bignoniaceae. It has been placed by some writers in the Pedaliaceae, but perhaps should be treated as constituting a distinct family.

Tourrettia lappacea (L'Hér.) Willd. *T. volubilis* Gmel. Frequent in thickets and forests of the central region, chiefly at 1,200–1,800 meters; region of Zarcero. Mexico to Peru. A large or small vine, rather succulent; leaflets mostly 3–5 cm. long, very thin, ovate or rhombic, acute or acuminate, acute or obtuse at the base; calyx 1 cm. long, somewhat villosulous near the base; fruits 2–4 cm. long. The curious fruits suggest those of some members of the Cucurbitaceae.

Sesamum orientale L. (*Sesame; Ajonjoli*), of the family Pedaliaceae, native of the Old World, probably is in cultivation in

Costa Rica, but I find no records of its occurrence. It is grown in many parts of Central America for its seeds, used for flavoring confectionery.

The genus *Martynia* (family Martyniaceae) likewise must be represented in Costa Rica, but I have seen no specimens or records. *M. annua* L. is almost certain to be found in the Pacific tierra caliente.

OROBANCHACEAE. Broom Rape Family

Reference: Beck-Mannagetta, Pflanzenreich IV. 261. 1930.

The family is represented in Central America by a single genus.

CONOPHOLIS Wallr.

Parasitic herbs, without any green coloration, attached to the roots of other plants, the stems low, very thick and fleshy, simple, usually forming dense clumps, covered with large, imbricate scales representing the leaves; flowers subsessile or the lowest pedicellate, forming dense, bracted spikes; calyx spathaceous, gamosepalous, 4-dentate; corolla gamopetalous, the thick tube ventricose at the base, the limb bilabiate, the upper lip fornicate, entire or emarginate, the lower trilobate; stamens 4, subequal, inserted on the corolla tube, the anthers 2-celled; ovary 1-celled, the style simple, the stigma capitate-dilated; fruit capsular, bivalvate, the minute seeds numerous.—The genus consists of probably a single species.

Conopholis americana (L.) Wallr. Occasional in deep forest of the higher mountains, mostly at 2,000–3,000 meters. Extending far northward through the United States. Stems 30 cm. high or less, the plants yellowish white or pale yellow, glabrous; bracts usually appressed to the stems, lanceolate, long-acuminate, thick and rather rigid; corolla yellowish, glabrous, longer than the calyx, the whole flower 2 cm. long or less. The plants probably are parasitic on roots of *Quercus*. They may be recognized at once by their lack of chlorophyll and by the gamopetalous corolla. In Costa Rica they grow in the darkest forest, where they receive but scant light and no direct sunshine.

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